

Question Bank			
BDCGA IBSANT1			
Section 1: GENERAL ANATOMY			
CHAPTER 1: INTRODUCTION			
Short Answer			
1. Four important criteria of anatomical position of the human body.	10	4	D01
CHAPTER 2: SKELETON			
Short Essays			
1. Classify the bones and explain the components of the long bone.	49	33	J14
2. Classification of bones.	49	33	D16
3. Sesamoid bone.	55	36	D03
4. <u>Epiphyses</u> —definition, types and examples.	64	40	D09(RS2), J05, J08
5. Blood supply of a long bone.	67	37	D06, J11
Short Answers			
1. Classification of bones.	49	33	J99
2. Define pneumatic bones with example. Mention its functional significance.	52	36	J98
3. Sesamoid bone—features, examples.	55	36	D00, J06, D09, J12
4. Name the types of lamellae in compact bone.	59	33	D02
5. <u>Growing end of long bone</u> .	64	40	D05(RS2)
6. What are the types of epiphysis? Define each with example.	64	40	J98, J01, D04
7. <u>Epiphysis</u> .	64	40	J07(RS2), J14(RS3), D98
8. Metaphysis.	65	34	D98
9. Atavistic epiphysis.	65	40	J03
10. Traction epiphysis.	65	40	D03
11. Blood supply of long bone.	67	37	D07(RS2)
12. Laws of ossification.	71	38	J11(RS2), D99, J00, J04
13. Types of cartilages with examples.	75	32	J15
14. What are the features of fibrocartilage?	76	32	D06(RS2)

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Anatomy			
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CHAPTER 3: JOINTS			
Short Essays			
1. Classification of joints.	87	43	J08(RS2)
2. Classify joints. Discuss the components of the synovial joints.	87, 97	43, 46	D13
3. Classification of cartilaginous joints.	94	46	J98
4. Features of a typical synovial joint.	97	46	J05(RS2), J09
Short Answers			
1. Classify fibrous joints and give examples for each.	91	44	J14
2. <u>Fibrous joint</u> (types).	91	44	D15(RS3), J99, J10
3. Sutural joints.	91	44	D08
4. Syndesmoses.	93	45	J07, J09
5. Cartilaginous joint.	94	46	D12(RS3)
6. Synchondrosis (primary cartilaginous joint).	94	46	D07
7. Symphysis (secondary cartilaginous joint).	95	46	J08
8. Define symphysis and give any two examples.	95	46	D11
9. Structural features of typical synovial joint.	97	46	J07, D07
10. <u>Classify synovial joint</u> with examples of each type.	98	48	J13(RS3), J01, D04
11. Name any two hinge joints.	99	48	J06
12. Mention two examples of pivot joints.	100	48	D05
13. Hilton's law.	111	—	J03
CHAPTER 4: MUSCLES			
Short Answers			
1. Bursa and its functions.	—	20	J06(RS2), J00, D00
2. What is the difference between a multipennate muscle and a strap muscle?	134	26	D05
3. Give the types of pennate muscles with one example of each.	135	26	D10, D14
4. Bipennate muscle.	135	26	D07
5. <u>Prime movers</u> with examples.	150	28	J17(RS3)

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CHAPTER 5: CARDIOVASCULAR SYSTEM**Short Answers**

1. Collateral circulation. — 65 J14(RS3), D08
 2. Name various types of capillaries and 172 66 D10(RS2), D07
 sites where they are present.
 3. End arteries—definition and examples. 178 65 D16(RS3), D08,
 J08, D15

CHAPTER 6: LYMPHATIC SYSTEM

None

CHAPTER 7: NERVOUS SYSTEM**Long Essay**

1. Draw and label a typical spinal nerve. What — 60 J00
 is its distribution and applied anatomy?

Short Answers

1. Define a spinal segment. — — D99, D06, J08
 2. Draw and label part of a multipolar 213 54 D05(RS2), D99,
 neurons. J04
 3. Give any four differences between axon 213 54 J01, D02, D04
 and dendrite.
 4. Types (classification) of neurons. 214 55 D03
 5. Name any two types of synapses and 215 56 D00
 two neurotransmitters.
 6. Mention the types of neuroglia giving 215 57 J02, D06
 examples.

CHAPTER 8: SKIN AND FASCIAE**Short Essay**

1. Interosseous membrane. 267 — J08(RS2)
Short Answers
 1. Name the appendages of skin. 253 17 D01, J06
 2. Give any six functions of skin. 259 18 D11
 3. Enumerate the functions of interosseous 267 — D11
 membrane.

CHAPTER 9: CONNECTIVE TISSUE, LIGAMENTS AND RAPHE**Short Answers**

1. Name the components of the connective 273 — J13
 tissue.
 2. Connective tissue fibers. — D18(RS3)
 3. Name the types of connective tissues 274 — D00
 giving examples.
 4. Cells of connective tissue. 274 — J11(RS2)

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Section 2: UPPER LIMB**CHAPTER 10: INTRODUCTION**

None

CHAPTER 11: BONES OF UPPER LIMB**Short Essays**

1. Coracoid process of scapula. 9 98 D01
 2. Upper end of humerus. 13 102 J06(RS2)

Short Answers

1. Mention peculiarities of the clavicle. 6 95 J98, D99
 2. Muscles attached to clavicle. 7 95 J05
 3. Name ligaments attached to clavicle. 7 — J02
 4. Coracoid process. 9 98 J15(RS3),
 D18(RS3)
 5. Name muscles attached to medial 9 98 D00
 border of scapula.
 6. Attachments to coracoid process of 9 scapula. 100 J00, J01, D04,
 D05, J11, D16
 7. Bicipital groove of humerus and 13 103 J98, J05, D06,
 structures attached. J08, D08
 8. Surgical neck of humerus and structures 13 103 D05(RS2), J06
 related to it.
 9. Radial groove (spiral groove). 14 103 J99, D03
 10. Name the muscles arising from posterior 22 112 D08
 surface of shaft of ulna.
 11. Name the carpal bones. 25 114 J13(RS3)
 12. Pisiform bone. 25 115 D02

CHAPTER 12: PECTORAL REGION**Long Essay**

1. Describe the female mammary gland 36 124 J09(RS2),
 under the following headings: (a) Extent/
 position, (b) Structure, (c) Relations, (d)
 Blood supply, (e) Lymphatic drainage, (f)
 Nerve supply, (g) Applied anatomy, and
 (h) Development.

Short Essays

1. Mammary gland—blood supply, 38 124 D06(RS2),
 lymphatic drainage and applied anatomy. J08(RS2),
 J17(RS3),
 D17(RS3), D98,
 D07

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2. Pectoralis major.	44	121	D14(RS3) ↗ —
3. Pectoralis minor.	44	121	D13(RS3), ↗ D17(RS3)
4. Clavipectoral fascia—extent, attach- ments and structures piercing it.	45	120	J07(RS2), ↗ D11(RS3), J13(RS3), J99, J00, J06
5. Serratus anterior—attachments, nerve supply and actions.	45	121	J10(RS2), D02, D05, D14
Short Answers			
1. Retromammary space.	37	124	D06
2. Peau d'orange.	41	130	D09
3. Clavipectoral fascia.	45	120	J11(RS2) ↗
4. Structures piercing clavipectoral fascia.	45	120	D00, J03, D06, D08, J10
5. Winging of scapula and how it is produced?	47	124	J98
CHAPTER 13: AXILLA			
Long Essays			
1. Describe the <u>axillary artery</u> under the following headings: (a) Beginning and termination, (b) Relations, (c) Branches, and (d) Applied anatomy. —	50	134	J07(RS2), D01, J15
2. Describe the <u>brachial plexus</u> under the following headings: (a) Formation, (b) Parts (Roots, trunks, cords), (c) Relations, (d) Branches and distribution, (e) Applied anatomy. Add a note on carpal tunnel syndrome/Add a note on Erb's paralysis.	56	138	D06(RS2), J08(RS2), ↗ J12(RS3), D15(RS3), J10, D99, D03, D11, D15
Short Essays			
1. Axillary artery—extent, relations and branches.	50	134	J10(RS2), ↗
2. Axillary lymph nodes.	55	137	J11(RS2), D09
3. Describe the formation and branching pattern of the brachial plexus.	56	138	J11, D14
4. Lateral cord of brachial plexus.	57	139	D08, D13
5. Erb's point and its applied anatomy (Erb- Duchenne's paralysis).	59	142	D06 J05(RS2), ↗ J14(RS3), D98, D09

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Short Answers			
1. Structures forming anterior wall of axilla.	49	132	D05
2. Contents of axilla.	49	133	J10(RS2) ↗
3. Branches of <u>axillary artery</u> (2nd part and 3rd part).	53	135	J05(RS2) ↗ J01, D04, D05, J06, D13
4. Long thoracic nerve.	58	139	J06
5. Branches of medial cord of brachial plexus.	58	140	D00, J14, J15
6. Branches of posterior cord of the brachial plexus.	58	140	D16(RS3) ↗
7. Erb's point—Formation.	59	142	J13(RS3), D16
8. Erb's paralysis.	59	142	J01, D04
9. Klumpke's paralysis.	59	142	J08
CHAPTER 14: BACK			
Short Essays			
1. Trapezius muscle.	65	147	D14(RS3) ↗
2. Rhomboideus major muscle.	65	148	D17(RS3) ↗
Short Answer			
1. Nerve supply and actions of trapezius muscle.	65	147	J12(RS3), J03
CHAPTER 15: SCAPULAR REGION			
Long Essay			
1. Describe the root value, formation course, relations and branches of axillary nerve. Give its applied anatomy. What are effects of injury at surgical neck of humerus?	75	155	J99, D07
Short Essays			
1. <u>Deltoid muscle</u> —location, attachments, nerve supply and action.	70	150	J08(RS2), ↗ D13(RS3), D18(RS3), J00, D01, J05, J06
2. Structures under cover of deltoid muscle.	71	152	J16(RS3) ↗ J18(RS3)
3. Rotator cuff of shoulder.	73	153	J15(RS3), D10, J15

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4. Describe the boundaries and contents of the intermuscular spaces in the upper limb (quadrangular and triangular spaces).	75	154	J09(RS2), J02, D04, J07, D13	
5. Axillary nerve (circumflex nerve).	75	155	J14(RS3), J98, J12	
6. Anastomosis around scapula.	76	156	J12	
Short Answers				
1. Nerve supply and action of deltoid.	70	150	D03, J13	
2. Rotator cuff (muscles forming it).	73	153	J09(RS2), J18(RS3), D16	
3. Boundaries and contents of the inferior triangular intermuscular space in the arm.	75	154	D11(RS3), J14	
4. Axillary nerve in relation to surgical neck of humerus.	75	155	D14(RS3)	
CHAPTER 16: CUTANEOUS NERVES, SUPERFICIAL VEINS AND LYMPHATIC DRAINAGE				
Short Essays				
1. Venous drainage of upper limb.	82	88	D06	
2. Cephalic vein.	83	88	J12(RS3)	
Short Answers				
1. Supraventricular nerve.				
2. Cutaneous innervation of dorsum of hand.	78	119	D05	
3. Cutaneous nerve supply of ring finger—diagram only.	79	86	J98, J03	
4. Cephalic vein.	80	—	D15(RS3)	
5. Basilic vein—commencement, termination and tributaries.	83	88	J13(RS3), D13(RS3), D17(RS3)	
6. Median cubital vein—connection and applied importance.	83	89	D99	
CHAPTER 17: ARM				
Long Essay				
1. Describe the origin, root value, course, relations, branches and applied anatomy of radial nerve (till it reaches elbow).	101	166	D00, J02, J04, D05	

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Short Essays				
1. Biceps brachii muscle—attachments, nerve supply and actions.	91	159	D05(RS2), D99, J08	
2. Musculocutaneous nerve—root value, origin, relations, course, branches.	92	164	J08, J09, J10	
3. <u>Brachial artery</u>	94	162	J06(RS2), D02, J07	
4. Anastomosis around elbow joint.	95	—	D06(RS2), D99	
5. Cubital fossa—boundaries and contents.	97	169	J07(RS2), D09(RS2), J16(RS3), D98, J08	
Short Answers				
1. Events at insertion of coracobrachialis.	90	—	J00	
2. Coracobrachialis.	91	159	J15	
3. Biceps brachii muscle (attachments, nerve supply and actions).	91	159	J14	
4. Brachialis—attachments, nerve supply and action.	91	159	J04	
5. <u>Musculocutaneous nerve</u> (muscles supplied).	92	164	J11(RS2), D11	
6. Branches of brachial artery.	95	162	D03	
7. <u>Cubital fossa</u> —boundaries, contents and clinical applications (neat labeled diagram).	97	169	D12(RS3), J99, J05, J06, D10, D14	
8. <u>Radial nerve in spiral groove</u> .	98	167	D17(RS3)	
9. Saturday night palsy.	101	143	J04, J05, D05	
10. <u>Wrist drop</u> .	102	167	D06(RS2), D99, J03, J06	
11. Branches of profunda brachii artery.	102	162	J09	
CHAPTER 18: FOREARM AND HAND				
Long Essays				
1. Describe the <u>ulnar nerve</u> in the palm under the following headings: (a) Root value, (b) Relations, (c) Branches of distribution, and (d) Applied anatomy.	127	207	J05(RS2), D14	

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2. Name the spaces in the palm. Describe	132	212	D09(RS2)
the boundaries of midpalmar space. Add a note on its applied anatomy.			
Short Essays			
1. Flexor digitorum superficialis muscle.	107	177	J02, D04
2. Radial artery—origin, termination, course, relations and branches.	111	202	D05, J14
3. <u>Flexor retinaculum of hand.</u>	116	182	D05(RS2), D12(RS3), D15(RS3), D99
4. Palmar aponeurosis.	117	183	J00
5. <u>Lumbricals</u> —attachments, nerve supply, action and applied importance.	123	189	D16(RS3), D18(RS3), J04, J13, D16
6. <u>Interossei</u> of hand.	123	189	J13(RS3) ↗
7. <u>Superficial palmar arch</u> —position, formation and branches.	123	203	D13(RS3), J14
8. Deep palmar arch.	126	204	D10
9. <u>Ulnar nerve in hand.</u>	127	207	J06(RS2), J18(RS3), D98
10. <u>Median nerve in palm (hand).</u>	128	205	J10(RS2), D10(RS2)
11. Carpal tunnel syndrome.	130	183	
12. <u>Boundaries and contents of the midpalmar space.</u>	133	212	J01, D08, D11
13. Anatomical snuff box—boundaries and contents.	136	197	D09, D11
14. <u>Extensor reticulum of wrist/hand.</u>	135	198	J10(RS2), D10(RS2), J18(RS3), J07
15. <u>Supinator muscle.</u>	138	196	D09(RS2) ↗
16. Posterior interosseous nerve.	139	211	J01
Short Answers			
1. Pronator teres muscles.			
2. Flexor digitorum profundus—nerve supply and action.	107	177	J99
	110	177	D09

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3. <u>Anterior interosseous artery.</u>	112	201	J16(RS3)
4. <u>Flexor reticulum of hand</u> —attachments/ structures passing superficial/structures passing deep (through carpal tunnel).	116	182	J09(RS2), J10(RS2), J11(RS2), J00, D00, J05, J09, D12, D14, J15, D15
5. <u>Palmar aponeurosis.</u>	117	183	J11(RS2), J13(RS3), J16(RS3)
6. Dupuytren's contracture.	117	184	D06
7. Name the thenar muscles and their nerve supply.	119	186	D15
8. Muscles of thenar eminence.	119	186	J05(RS2), D08(RS2) ↗
9. Adductor pollicis.	123	186	D12(RS3), J15(RS3)
10. <u>Lumbricals of hand</u> —nerve supply, actions.	123	189	J06(RS2), J08(RS2), D11(RS3), J05, D10, J11, D13
11. <u>Superficial palmar arch.</u>	123	203	D08(RS2)
12. Nerve supply of dorsal interossei of hand.	124	189	J10
13. Deep palmar arch.	126	204	D07(RS2)
14. Claw hand.	128	209	D09(RS2), J11(RS2), D02, J04
15. <u>Ulnar claw hand.</u>	128	209	D12
16. <u>Median nerve in carpal tunnel.</u>	128	205	D13(RS3), J16(RS3)
17. Fascial spaces of hand.	132	212	D06(RS2)
18. <u>Midpalmar space.</u>	133	212	D05(RS2)
19. <u>Anatomical snuff box.</u>	136	197	J17(RS3)
20. <u>Dorsal digital expansions</u> —components.	137	195	J17(RS3), J00, D02, D15
21. <u>Posterior interosseous artery.</u>	140	201	D14(RS3)

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■ CHAPTER 19: JOINTS OF UPPER LIMB

Long Essays

1. Describe the shoulder joint under 146 219 J10(RS2),
the following headings: (a) Type and
subtype, (b) Formation/articular ends,
(c) Capsule and ligaments, (d) Relations,
(e) Movements and muscles producing
them, (f) Blood supply, (g) Nerve supply.
Add a note on applied anatomy.

2. Describe the elbow joint under the 151 226 J16(RS3)

3. Describe the first carpometacarpal joint 161 234 D10(RS2)

Short Essays

1. Scapular movements. 144 218 J07(RS2)

2. Describe the articular surfaces, 146 219 J14

3. Abduction and adduction movements at 148 222 D06

4. Radioulnar joints. 155 229 J09(RS2), J98,
D03

5. Supination and pronation 157 231 D08(RS2),
J11(RS2),
J18(RS3), D02,
J10

6. Movements of wrist joint. 159 232 D07(RS2),
D11(RS3)

7. First carpometacarpal joint of thumb. 161 234 J07

8. Movements of thumb and muscles 162 234 D08, J09

Short Answers

1. Coracoclavicular ligament. 144 216 D09(RS2)

2. Coracoacromial arch—attachments and 145 221 D06(RS2)

3. Glenohumeral ligaments. 147 220 D07(RS2),
J12(RS3)

4. Radioulnar joint. 155 229 D07(RS2)

5. Functions of interosseous membrane. 157 — D99

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6. Muscles responsible for pronation and 157 231 D00, D15
supination (supinators and pronators)
and their nerve supply.

7. Muscles supinating forearm with their 157 196 D07
nerve supply.

■ CHAPTER 20: MISCELLANEOUS

Long Essays

1. Describe the formation, branches, 180 165, 205 D10
distribution and applied anatomy of
median nerve.

2. Describe the origin, course, relations 181 165, 207 J06
and distribution of the ulnar nerve. Add
a note on its applied anatomy (related
to its damage in forearm).

Short Answer

1. Root value and muscles supplied by the 179 166, 210 J14(RS3)
radial nerve.

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Section 3: THORAX

■ CHAPTER 21: INTRODUCTION

Short Essays

1. Sternal angle—location, events 195 22 J04, J07, J12
occurring, clinical importance.

2. Supraperitoneal membrane. 199 32 D07(RS2)

Short Answers

1. Sternal angle—its importance and 195 22 J06(RS2),
events occurring. D06(RS2),
J11(RS2),
D13(RS3),
J18(RS3), J98,
D02

2. Supraperitoneal membrane (Sibson's 199 32 J13(RS3), J07,
fascia)—attachments. D16

■ CHAPTER 22: BONES AND JOINTS OF THORAX

Short Essay

1. First rib. 206 20 D06(RS2)

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Short Answers	—	27	D16
1. Xiphisternal joint.	—	20	J07(RS2), J15(RS3), J17(RS3), J03
2. First rib (peculiarities/atypical features, structures related).	209	23	D09
3. Cervical rib.	210	17	J15
4. Name the muscles attached to sternum.	213	11	D03, D06, J13
5. Identify features of typical thoracic vertebra.			

■ CHAPTER 23: WALLS OF THORAX

Long Essay

1. Describe course, branches and distribution of typical intercostal nerve.	226	43	J07(RS2)
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Short Essays

1. First intercostal space.	—	32	J03
2. Typical intercostal space—boundaries and contents.	—	32	D08(RS2), J16(RS3), D18(RS3), J08, J15
3. Typical intercostal nerve—course, relations and branches	226	43	J05(RS2), J17(RS3), D06, D00
4. Azygos system of veins—definition, labeled diagram and applied anatomy.	232	42	D05
5. Azygos vein (vena azygous).	232	42	D10(RS2), D13(RS3), D14(RS3), J99, J09, D14

Short Answers

1. Contents of a typical intercostal space.	—	—	D98, D16
2. Superior intercostal artery.	—	40	J09
3. Anterior intercostal membrane.	225	33	J11
4. External intercostal muscle.	225	33	J08(RS2), D06(RS2), J13
5. Typical intercostal nerve (branches).	226	43	D99, D14
6. Enumerate the contents of costal groove with their relations (order and name of structures in costal groove).	227	19	

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7. Azygos vein—level, formation, termination and tributaries.	232	42	D02, J11, D11, J15
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■ CHAPTER 24: THORACIC CAVITY AND PLEURAE

Short Essays

1. Pleura.	239	54	D10
2. Pleural recesses—location, events occurring, clinical importance.	242	58	J07(RS2), J12(RS3), J16(RS3), J98, J04, D12

Short Answers

1. Pulmonary ligament and its function.	242	—	D12(RS3), D99, D06
2. Pleural recess and its role.	242	58	J03
3. Costodiaphragmatic recess.	242	58	D16

■ CHAPTER 25: LUNGS

Long Essays

1. Describe the lungs under the following headings: (a) Labeled diagram of mediastinal surfaces showing position of related structures including structures in both hila, (b) Development, (c) One congenital malformation.	246	65, 63	D05
2. Define bronchopulmonary segments. Name the bronchopulmonary segments present in the left lung and add a note on its applied aspects. Draw a labeled diagram of the medial surfaces of both lungs.	252	68	D05(RS2) ↗

Short Essays

1. Right lung.	246	64	D12(RS3), D18(RS3)
2. Mediastinal surface of lung.	247	64	D07(RS2), D10(RS2), J99
3. Mediastinal surface of left lung with the aid of diagram.	248	66	J08(RS2), J06
4. Mediastinal surface of right lung with the aid of diagram.	248	65	D06(RS2)
5. Root of right lung—relations and structures forming it.	248	67	
6. Hilum of lungs.	249	64, 66	D00

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7. List the differences between right and left lung.	249	65	J13
8. Bronchopulmonary segments (of left/ right lung).	252	68	J06(RS2), J11(RS2), D14(RS3), J17(RS3), J00, J02, D04, D08, J11, D11, D15, D16
Short Answers			
1. Draw a neat labeled diagram of medial surface of left lung.	248	66	D15(RS3)
2. Root of lung (right)—contents.	248	67	D17(RS3), J98, D15
3. Hilum of right lung (structures present).	249	64	J09(RS2), D98
4. Hilum (root) of left lung.	249	66	D03, J04
5. Blood supply of lungs.	249	70	D09(RS2), J10
6. Mention the lymphatic drainage of lungs.	250	71	D10
7. Draw and label hilum/root of right lung.	250	65	D11, D14
8. Differences between right and left principle bronchus and its clinical significance.	251	61	D03
9. Define a bronchopulmonary segment.	252	68	J03
10. Bronchopulmonary segments of left lung (upper lobe).	252	68	J04, J09
CHAPTER 26: MEDIASTINUM			
Long Essay			
1. Define mediastinum. Mention the contents of posterior mediastinum. Describe the thoracic part of esophagus. Add a note on its applied anatomy.	259, 261, 298	49	D08(RS2)
Short Essays			
1. Division of mediastinum and name the contents of superior mediastinum.	259	50	J11
2. Superior mediastinum—boundaries and contents.	259	50	J09(RS2), J14(RS3), D17(RS3), D08, D14

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3. Posterior mediastinum—boundaries and contents.	261	50	D18(RS3), J99, D03, D07
Short Answers			
1. Superior mediastinum—contents.	260	51	D02, J10, J13
2. Anterior mediastinum—boundaries and contents.	260	53	D11
3. Middle mediastinum—contents.	260	53	J04
4. Posterior mediastinum—contents.	261	53	D07(RS2)
CHAPTER 27: PERICARDIUM AND HEART			
Long Essays			
1. Describe right atrium under following headings: (a) Borders and surfaces, (b) Relations, (c) External and internal features including openings, (d) Blood supply and nerve supply, (e) Development including that of interatrial septum, (f) Anomalies.	267	82	J06(RS2), D07(RS2), D13(RS3), D02, D04, J06, D06
2. Describe the external and internal features of the left atrium.	271	83	D13
3. Describe blood supply of heart. Give its applied anatomy. Add a note on development of interatrial septum.	278	93	J11(RS2), D11(RS3), D17(RS3), D98, D99, D12, J14
Short Essays			
1. Pericardium—layers and sinuses.	263	76	J06, D15
2. Fibrous pericardium.	263	77	J03
3. Serous pericardium.	264	77	D10(RS2)
4. Pericardial sinuses.	264	77	D14(RS3), J12
5. Transverse sinus of heart.	264	78	J13(RS3)
6. Oblique sinus of pericardium.	265	77	D13(RS3)
7. Sternocostal surface of heart.	267	81	J98
8. Right atrium.	267	82	D09(RS2), D12(RS3)
9. Interior of right atrium.	270	82	J10(RS2), D07, D16
10. Openings of Right atrium.	270	82	J18(RS3)
11. Interatrial septum and its development.	270	84	J05(RS2), D05
12. Interventricular septum.	271	85	D00
13. List the differences in the interior of the right and left atrium.	—	—	J14

Contd... —

Contd...	BDC Vol: 1 IBSANT2		
14. Chordae tendinae.	271	86	D17(RS3) ↗
15. Right coronary artery.	278	93	D06(RS2), ↗ D12(RS3), D01
16. Left coronary artery.	279	94	D15(RS3), D00
17. Venous drainage of heart.	280	95	J09(RS2), ↗ J15(RS3), D09
18. Coronary sinus—formation, course and tributaries	281	110	J16(RS3), ↗ J18(RS3), D98, J01, D03, D10, J11, D11
Short Answers			
1. Triangle of koch.	—	—	D09
2. Pericardial sinuses.	264	77	D18(RS3) ↗
3. Transverse sinus of pericardium.	264	78	D08(RS2), J02
4. Oblique sinus of pericardium (boundaries).	265	77	J04
5. Openings in right atrium.	270	82	J08(RS2), D98, J05
6. Papillary muscles	271	87	D01
7. Moderator band.	271	87	D13(RS3), D14(RS3) ↗
8. Where are SA and AV nodes located? Give their blood supply.	277	91	J02
9. Name the branches of right coronary artery.	278	93	D14, D16
10. Areas supplied by right coronary artery.	279	94	J05, J13
11. Branches of left coronary artery and parts of heart supplied.	279	94	J03, J10
12. Coronary sinus—termination, tributaries and development.	281	95	J05(RS2), ↗ J17(RS3), J98
13. Nerve supply of heart (cardiac plexuses).	282	96	D09(RS2), D01
14. Deep cardiac plexus.	282	126	D15(RS3) ↗

CHAPTER 28: SUPERIOR VENA CAVA, AORTA AND PULMONARY TRUNK

Long Essay

1. Describe arch of aorta under following headings: (a) Situation, (b) Origin, course and termination (extent), (c) Relations and branches (including rare branches), (d) Development and anomalies.

Contd... —

Contd...

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Short Essays

1. Arch of aorta—branches and relations.
2. Draw and label a cross section of thorax at level of T4.

Short Answer

1. Arch of aorta—branches.

CHAPTER 29: TRACHEA, ESOPHAGUS AND THORACIC DUCT

Long Essay

1. Describe thoracic part of esophagus under following headings: (a) Extent, (b) Course and relations, (c) Blood supply and nerve supply, (d) Constrictions, (e) Applied anatomy, (f) Microscopic structure.

Short Essays

1. Trachea—extent, labeled diagram, applied anatomy.

2. Thoracic duct—extent, length, formation, course, relations, area of drainage and termination.

Short Answers

1. Sites of normal constrictions in esophagus and structures compressing it.
2. Thoracic duct—commencement and termination.

CHAPTER 30: MISCELLANEOUS

Diaphragm though part of Paper I is covered in Abdomen section (please refer it there).

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Section 4: LOWER LIMB

CHAPTER 31: INTRODUCTION

None

CHAPTER 32: BONES OF LOWER LIMB

Short Essays

1. Ischial tuberosity.

12 275 J01

Contd... —

Contd...	BDC Vol: 2 IBSANT1		
2. Greater trochanter of femur.	15	282	J05
3. Patella.	21	287	J13(RS3)
4. Upper end of tibia.	24	289	D00
Short Answers			
1. Greater sciatic notch.	8	274	D14(RS3) —
2. Ischial spine.	12	275	D05
3. Ischial tuberosity—muscles attached.	13	278	D10, D14
4. Define femoral torsion.	15	287	J99
5. Greater trochanter of femur.	15	282	D05(RS2)
6. Lower end of femur.	16	284	J09
7. Linea aspera of femur.	16	283	J11(RS2)
8. Adductor tubercle.	16	284	J03
9. Muscles attached to femur (greater trochanter/linea aspera).	17	285	J07(RS2), J05, J06
10. Medicolegal importance of ossification center to lower end of femur.	21	286	J01, D04, D07
11. Patella (how it differs from other bones and bursae in relation to it).	21, 156	287	J98, J05
12. How do you differentiate left from right patella?	21	287	D16
13. Tibial tuberosity.	24	289	J04
14. Soleal line.	24	290	D03
15. Structures attached to anterior intercondylar area of tibia.	26	290	D08

CHAPTER 33: FRONT OF THIGH

Long Essays

1. Describe femoral triangle under following headings: (a) Boundaries, (b) Contents, (c) Applied aspects. 48 307 J13(RS3)
2. Describe femoral artery under following headings: (a) Extent (Origin and termination), (b) Course and relations, (c) Branches, (d) Anastomoses, (e) Applied anatomy. 53 319 J07(RS2), J05
3. Describe femoral nerve under following headings: (a) Origin, (b) Course, (c) Termination (d) Relations, (e) Branches. 55 326 J03

Contd... —

Contd...	BDC Vol: 2 IBSANT1		
Short Essays			
1. Cutaneous nerve supply of front of thigh.	45	262	J14(RS3)
2. Iliotibial tract.	47	306	J18(RS3)
3. Femoral triangle—boundaries and contents.	48	307	D10(RS2), D98, D06, D09, J13, J15
4. Femoral sheath—formation, divisions, contents, applied anatomy.	50	308	D05(RS2), D06(RS2), J08(RS2), D09(RS2), D16(RS3), J99, D00, J04, D05, D08, J14
5. Femoral canal (applied anatomy).	51	309	J16(RS3) —
6. Profunda femoris artery.	54	321	D11(RS3), D18(RS3), J98, D99, J12
7. Femoral nerve—root value, course, branches.	55	326	J17(RS3), D07, D11
8. Quadriceps femoris.	57	311	J08(RS2)
9. Adductor canal—boundaries and contents.	60	318	J09(RS2), D09(RS2), D15(RS3), D17(RS3), D01, J07, J09, J11, D13
Short Answers			
1. House maid's knee.	47	410	J18(RS3)
2. Iliotibial tract.	47	306	J15(RS3), D13
3. Femoral triangle—boundaries, floor, contents and its posterior relations.	48	307	D99, J01, D04, J07
4. Femoral sheath—formation, division, contents and applied anatomy.	50	308	D08(RS2), J18(RS3), D18(RS3), D04, J07
5. Femoral canal—situation, contents, applied anatomy.	51	309	J17(RS3), D17(RS3), D07, J09, D14
6. Femoral ring.	51	309	J11
7. Branches (superficial) of femoral artery.	53	320	D14(RS3), J08
8. Profunda femoris artery (branches).	54	321	J06(RS2), D15(RS3)

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9. Branches of femoral nerve.	56	326	D06(RS2), D09
10. Cutaneous branches of femoral nerve with areas of distribution.	56	326	J98
11. Sartorius muscle.	58	312	J13(RS3), D08
12. Quadriceps femoris (components and action).	57	311	D13(RS3), J06, D15
13. Rectus femoris.	58	311	D14(RS3)
14. Adductor canal—contents.	60	318	D08(RS2), D98

CHAPTER 34: MEDIAL SIDE OF THIGH

Long Essays

1. Name the adductor compartment muscles of the thigh (adductors of thigh). Give origin, insertion, morphology, relations, nerve supply, actions and openings and structures passing through the adductor magnus muscle.
2. Describe the (a) formation, (b) course, (c) branches, and (d) applied anatomy of obturator nerve.

Short Essays

1. Adductor magnus muscle.
2. Obturator nerve—root value, course, branches, applied anatomy.

Short Answers

1. Adductor muscles.
2. Nerve supply to adductor muscles.
3. Adductor longus.
4. Pecten.
5. Two functional components of adductor magnus.
6. Obturator nerve—root value, muscles supplied.
7. Structure supplied by anterior division of obturator nerve.

Contd...

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CHAPTER 35: GLUTEAL REGION

Long Essays

1. Describe the gluteus maximus muscle under the following headings: origin, insertion, nerve supply and action. Add a note on structures under cover of gluteus maximus.
2. Enumerate structures under cover of gluteus maximus. Describe in detail sciatic nerve and its applied anatomy.

Short Essays

1. Gluteus maximus muscle—origin, insertion, nerve supply and actions.
2. Gluteus medius and minimus.
3. Piriformis muscle.
4. Greater sciatic foramen.
5. Lesser sciatic foramen—formation and structures transmitted.

Short Answers

1. Name glutei muscle and their nerve supply.
2. Gluteus maximus muscle.
3. Gamelli muscles.
4. Obturator internus—nerve supply and action.
5. Draw a neat labeled diagram of structures under cover of gluteus maximus.
6. Name muscles supplied by superior gluteal nerve and mention their actions.
7. Inferior gluteal nerve.
8. Cruciate anastomosis—formation and applied aspect.
9. Structures passing through greater sciatic foramen.
10. Name the structures emerging above and below the piriformis muscle.

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■ CHAPTER 36: POPLITEAL FOSSA

Long Essay

1. Describe popliteal fossa under following 81 345 D05(RS2), ~~✓~~
headings: (a) Boundaries, (b) Contents, D12(RS3), D01,
(c) Applied anatomy. Describe origin, D07, J12
course and branches of popliteal artery.

Short Essays

1. Lateral popliteal nerve. — D05
2. Popliteal fossa—boundaries and 81 345 D08(RS2), J05,
contents. D12, D14
3. Popliteal artery—origin, termination and 83 346 D05, D11
branches.
4. Common peroneal nerve—origin, course 86 349 D15(RS3), J13,
and branches. D15

Short Answers

1. Popliteal fossa—boundaries and 81 345 D17(RS3), D04
contents.
2. Popliteal artery—branches. 84 347 D09
3. Foot drop. 86 426 D07(RS2), J01,
D04

■ CHAPTER 37: BACK OF THIGH

Long Essays

1. Name hamstrings of thigh. Mention 89 341 J06
origin, insertion, nerve supply and
actions of semimembranosus.
2. Describe sciatic nerve under following 90. 338 J05(RS2), ~~✓~~
headings: (a) Root value, (b) Origin, (c)
Course and relations, (d) Branches, (e)
Applied anatomy.

Short Essays

1. Hamstring muscles. 89 340 D07(RS2), ~~✓~~
2. Sciatic nerve—relations and branches 90 338 J11(RS2)
of distribution. J15(RS3) ~~✓~~
3. Biceps femoris muscle. 90 341 J17(RS3), D99

Short Answers

1. Hamstring muscles—enumerate, nerve 89 340 J10, D13
supply characteristic features.
2. Semimembranosus muscle. 90 341 D12(RS3) ~~✓~~

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■ CHAPTER 38: FRONT, LATERAL AND MEDIAL SIDES OF LEG AND DORSUM OF FOOT

Long Essay

1. Name dorsiflexors of ankle joint. Mention 102 356 J07
origin, insertion, nerve supply and action
of extensor digitorum longus.

Short Essays

1. Cutaneous nerve supply of dorsum of 99 263 D13(RS3), ~~✓~~
foot. D14(RS3), D16
2. Retinaculae around ankle joint. 99 354, 367 J11, J15
3. Extensor retinaculum of foot. 100 354 J05(RS2), ~~✓~~
D07(RS2), ~~✓~~
D11(RS3) ~~✓~~
4. Interosseous membrane of leg— 102 — J07
muscles attached.
5. Deep peroneal nerve. 103 360 D09(RS2) ~~✓~~
6. Dorsalis pedis artery—formation, 105 359 D05(RS2), ~~✓~~
termination, relations and branches. J06(RS2), ~~✓~~
J08(RS2), ~~✓~~
D17(RS3)
7. Superficial peroneal nerve. 108 364 D99

Short Answers

1. Great saphenous nerve. 98 326 J05
2. Sensory nerve supply of dorsum of foot. 99 263 J11(RS2), J05,
D11
3. Name the structures passing under the 100 355 D15
extensor retinaculum of foot.
4. Tibialis anterior. 102 356 J10
5. Muscles supplied by deep peroneal 103 360 J02, J08, J14
nerve (anterior tibial nerve).
6. Dorsalis pedis artery (origin and 105 359 D06(RS2),
branches). J13(RS3), J05,
D13
7. Peroneus longus muscle. 108 363 J10(RS2), ~~✓~~
J16(RS3), D09
8. Superficial peroneal nerve—muscles 108 364 D14(RS3) ~~✓~~
supplied.
9. Anserine bursa. 110 405 D08(RS2) ~~✓~~

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CHAPTER 39: BACK OF LEG**Short Essays**

1. Flexor retinaculum of foot—attachments, structures passing underneath. 115 367 J02, D04, J06, J10, J12
 2. Explain the attachments, action and nerve supply of the triceps surae muscle. 116 370 J13
 3. Popliteus—attachments, nerve supply, action. 118 368 J06(RS2), D10(RS2), D13(RS3), J98, D02, J04, J06

4. Peroneal artery. 120 376 J03
 5. Tibial nerve. 120 377 J12(RS3)

Short Answers

1. Sural nerve (area supplied). 114 427 D13(RS3), J06
 2. Structures passing deep to flexor retinaculum of foot. 115 367 D00, J14
 3. Tendocalcaneus. 116 370 J05(RS2), D09(RS2), J10(RS2)
 4. Peripheral heart. 116 371 J18(RS3)
 5. Popliteus muscle—attachments, action and nerve supply. 118 368 J09(RS2), J09

CHAPTER 40: SOLE OF FOOT**Short Essays**

1. Plantar aponeurosis. 124 378 D02
 2. Dorsal interossei muscles of sole. 130 383 D10
 3. Plantar (arterial) arch. 131 386 J05, D06

Short Answers

1. Name the muscles supplied by the medial plantar nerve in the sole. 126 387 D16
 2. Mention the muscles supplied by the lateral plantar nerve. 129 387 J13

CHAPTER 41: VENOUS AND LYMPHATIC DRAINAGE; COMPARISON OF LOWER AND UPPER LIMBS**Long Essay**

1. Describe the venous drainage of lower limb with its applied importance. 134 265

J14(RS3)

Contd... —

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Short Essays

1. Great saphenous vein/long saphenous vein—origin, course, tributaries and termination. 135 266 J12(RS3), D13(RS3), D02, D03, J10, D14, D16
 2. Small saphenous vein—formation, course, tributaries. 136 266 D08
 3. Varicose veins in lower limb. 137 268 J08
 4. Inguinal lymph nodes—groups, area of drainage and applied importance. 138 268 J00, D00, D07

Short Answers

1. Great saphenous vein (origin, termination, named tributaries). 135 266 J06(RS2), D01, D12
 2. Veins connected by medial ankle perforators. 137 267 D11(RS3)
 3. Varicose veins. 137 268 J09(RS2), J99
 4. Inguinal lymph nodes (superficial group). 138 268 J06(RS2), J09
 5. Areas of drainage of horizontal superficial inguinal lymph nodes. 138 268 J01, D04
 6. Areas of drainage of popliteal lymph nodes. 139 269 J07

CHAPTER 42: JOINTS OF LOWER LIMB**Long Essays**

1. Describe hip joint under following headings: (a) Type and bones taking part (formation/articular surfaces), (b) Ligaments, (c) Relations, (d) Movements and muscles producing them, (e) Neurovascular supply, (f) Applied anatomy. 147 392 J12(RS3), J06(RS2), D09(RS2), J17(RS3), J04, J08, J10, J14, D16
 2. Describe knee joint under following headings: (a) Type and bones articulating, (b) Capsule and ligaments, (c) Intra-articular structures (Menisci and cruciate ligaments), (d) Blood supply and nerve supply, (e) Movements and muscles producing them, (f) Locking and unlocking movements, (g) Bursae around knee joint, (h) Applied anatomy. 152 399 J08(RS2), J18(RS3), D03, D06, D12
 3. Describe intracapsular structures of knee joint. Add a note on locking and unlocking of knee joint. 155, 157 401, 407 J09(RS2)

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4. Describe ankle joint under following headings: (a) Type, (b) Capsule and ligaments, (c) Relations, (d) Movements and muscles producing them, (e) Blood supply, (f) Applied anatomy.	159	411	J10(RS2), J00, D11
5. Describe inversion and eversion. Name joints in which these movements occur and name muscles producing these movements, with their attachments and nerve supply in a tabulated form.	166	416	J09
Short Essays			
1. Describe the articular surfaces and movements of the hip joint.	147	393	D15
2. Ligaments of hip joint.	148	394	D15(RS3) ↗
3. Iliofemoral ligament—attachments and applied anatomy.	148	394	J05(RS2), J06
4. Abductors of hip joint.	150	396	D16(RS3)
5. Intra-articular structures of knee joint.	155	401	J15
6. Medial ligaments of knee (tibial collateral ligament).	154	401	J02
7. Lateral ligaments of knee.	154	401	D04
8. Cruciate ligaments of knee joint.	155	402	D08(RS2), ↗ J17(RS3), D01
9. Semilunar cartilage (medial meniscus).	155	403	D99, D14
10. Movements of knee joint.	156	406	J11
11. Locking and unlocking movements of knee joint.	157	407	D05(RS2), D14(RS3)
12. Deltoid ligament of ankle joint.	160	412	J07(RS2), J09(RS2), J07
13. Movements and applied anatomy of ankle joint.	161	413	J08
14. Tibiofibular joints.	162	410	D18(RS3) ↗
15. Spring ligament.	164	418	J01
16. Inversion and eversion of foot—joints involved and muscles acting.	166	416	D06(RS2), ↗ J16(RS3), D05, D09, D14
Short Answers			
1. Iliofemoral ligament.	148	394	D07(RS2), D14
2. Muscles performing lateral rotation of thigh (lateral rotator muscles of the hip joint).	150	396	D10(RS2)
3. Abductors of hip joint.	150	396	J06

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4. Name the ligaments of the knee joint.	152	401	D13
5. Capsule of knee joint.	152	400	J13(RS3)
6. <u>Ligamentum patellae</u> (patellar ligament).	154	402	D11(RS3), ↗ J16(RS3), D13
7. Tibial collateral (medial) ligament of knee joint.	154	401	J08(RS2), J05
8. Enumerate intra-articular structures in knee joint.	155	401	J10
9. Cruciate ligaments.	155	402	D17(RS3)
10. Medial meniscus.	155	403	D16(RS3)
11. Functions of menisci of knee joint.	155	403	D09
12. Bursa around knee joint.	156	404	D12(RS3)
13. Mention the genicular nerves supplying the knee joint.	156	406	J13
14. Muscles causing medial rotations of knee joint.	157	406	J07
15. Locking and unlocking of knee joint.	157	407	J17(RS3)
16. What is meant by locking of knee joint?	157	407	D11
17. Deltoid ligament—attachments.	160	412	J98, J10
18. Name subtaloid joints and mention movements possible in it.	163	414	J98
19. <u>Spring-ligament</u> —attachments.	164	418	D16(RS3), J99
20. Define eversion of foot. Muscles responsible for eversion of foot (evertors of foot) and their nerve supply.	166	416	D16(RS3), D99

CHAPTER 43: ARCHES OF FOOT**Long Essay**

1. Name and describe arches of foot (lateral longitudinal/medial longitudinal) under the following heads: (a) Types and bones taking part, (b) Factors maintaining the arches and, (c) Applied aspect.	171	419	D07(RS2), D08(RS2), J15(RS3), D15(RS3), D16(RS3), D18(RS3), D98, D00
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Short Essay

1. Longitudinal arches of foot (medial longitudinal arch of foot).	171	419	D10(RS2), ↗ J16(RS3), J99, J03, J09, D13
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Short Answers

1. Medial longitudinal arch of foot. 171 419 J11(RS2)
 2. Bones forming medial longitudinal arch 171 419 D06(RS2), ~~J07(RS2)~~, D15 of foot.
 3. Bones forming lateral longitudinal arch 172 419 D09(RS2), D08 of foot.

CHAPTER 44: MISCELLANEOUS

None

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Section 5: ABDOMEN AND PELVIS**CHAPTER 45: INTRODUCTION TO ABDOMEN AND OSTEOLGY****Short Answers**

1. Structure related to pelvic surface of — 154 D05(RS2)
 2. Sacral hiatus. 209 153 D13(RS3)
 3. Sacral canal (contents). 209 153 J14(RS3), D00
 4. Differences between male and female bony pelvis. 212 — J16(RS3)

CHAPTER 46: ANTERIOR ABDOMINAL WALL**Long Essays**

1. Describe rectus sheath under following headings: (a) Formation at different levels, (b) Contents, (c) Applied anatomy. 229 168 D12(RS3), ~~J16(RS3)~~, D02, D13
 2. Describe inguinal canal under following headings: (a) Location and extent, (b) Openings, (c) Boundaries, (d) Contents (structures passing through), (e) Natural safety mechanisms (factors preventing inguinal hernias), (f) Applied anatomy. Add a note on inguinal hernias. 232 165 D05(RS2), J10(RS2), ~~J13(RS3)~~, D17(RS3), J02, D03, J09, J15, D15

Short Essays

1. Transpyloric plane. 217 159 D13(RS3)
 2. Umbilicus. 218 160 J16(RS3), ~~J00~~
 3. Anterior abdominal wall—blood supply and nerve supply. 221 160 J03
 4. External oblique muscle. 222 162 J01
 5. Rectus abdominis. 222 162 D01
 224 167

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Anatomy

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6. Inguinal ligament—attachment and expansions. 225 164 J11(RS2)
 7. Conjoint tendon. 226 165 D00
 8. Rectus sheath—formation, contents and applied anatomy. 229 168 D10(RS2), ~~J14(RS3)~~, J04, D09, D10
 9. Inguinal canal—boundaries and contents. Defensive mechanism. 232 165 J17(RS3), J11
 10. Spermatic cord—coverings, contents. 233 166 J10(RS2), J00, D01, J04, J09
 11. Protective mechanism of inguinal canal. 233 166 D12(RS3)
 12. Inguinal hernia—types, coverings. 235 175 D07
 13. Indirect inguinal hernia. 235 175 D10

Short Answers

1. Physiological umbilical hernia. — 174 J04
 2. Transpyloric plane and structures lie on it. 217 159 J07(RS2), ~~J16(RS3)~~, D16(RS3), J18(RS3), J98
 3. Raspberry tumor. 219 — J05
 4. Ilioinguinal nerve. 220 170 J16(RS3), ~~J09~~
 5. Inguinal ligament. 225 164 J05
 6. Cremasteric reflex. 227 — J10
 7. Conjoint tendon. 226 165 J15(RS3)
 8. Cremaster. 226 167 J16(RS3)
 9. Pyramidalis muscle—attachments. 227 167 D13(RS3), ~~J14(RS3)~~, D15(RS3), J15
 10. Rectus sheath—muscles forming, contents. 229 168 D18(RS3), J05, J10
 11. Mention the layers present in the anterior wall of the rectus sheath at different levels. 230 168 D12
 12. Inguinal rings (superficial/deep). 232 164 D07(RS2), D08, D10, D14
 13. Mention the contents of the inguinal canal. 233 166 D14(RS3), D11
 14. Spermatic cord—coverings, contents. 233 166 D07(RS2), ~~J15(RS3)~~, J17(RS3), D99, D07, J08

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15. Name the coverings of the spermatic cord, and what are they derived from?	233	167	J14
16. Name the structures protecting the superficial and deep inguinal ring.	234	166	D12
17. Hesselbach's triangle.	—	175	D12(RS3)
18. Sites of hernia in the abdomen.	235	174	D99
19. What is indirect inguinal hernia?	235	175	J13
20. List the differences between direct and indirect inguinal hernia.	237	175	D13

CHAPTER 47: MALE EXTERNAL GENITAL ORGANS

Long Essays

1. Describe testis under following headings: (a) Location and gross features, (b) Blood supply, (c) Lymphatic drainage, (d) Development.	244	181	J06
2. Describe the coverings, microstructure (diagrammatic) and development of testis.	245, 248	182	D14(RS3)

Short Essays

1. Thermoregulation of testis.	—	—	D16(RS3)
2. Ectopic testis.	247	183	J10(RS2)
3. Descent of testis.	249	183	J18(RS3), D02, D05, J08, D12
4. Testis—labeled diagram.	245	182	D06(RS2), D07
5. What is tunica vaginalis? And what is the congenital anomaly associated with it?	245	182	D16
6. Venous drainage of testis (testicular vein).	246	183	J08(RS2)
7. Pampiniform plexus of veins.	246	183	D15(RS3)
8. Lymphatic drainage of testis.	246	183	D14
9. Mention the congenital anomalies associated with descent of the testis.	247	183	J13
10. What are the anatomical reasons for the left testicular varicosity?	247	183	D13

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11. Descent of testis (factors involved).	249	183	D08(RS2), D12(RS3), D99, D09
12. Gubernaculum testis.	249	183	D01, J03

CHAPTER 48: ABDOMINAL CAVITY AND PERITONEUM

Short Essays

1. Greater omentum—attachments, contents and functions.	257	201	D12(RS3), J14(RS3), J03, D07
2. Lesser omentum—attachments, contents.	258	200	D11(RS3), D16(RS3), D18(RS3), D01, J04, D05, J07, D08
3. Mesentery of small intestine—attachments and contents.	259	205	J07(RS2), D14(RS3), J16(RS3), D18(RS3), J99, J02, D04, J09, D09, J13 D13
4. Describe the vertical disposition of the peritoneum.	261	197	D13
5. Epiploic foramen.	263	200	D06(RS2), D10(RS2), J13(RS3), J00, J02, D03, D04
6. Lesser sac (omental bursa)—location, boundaries, openings, applied anatomy.	264	201	J05(RS2), D07(RS2), J11(RS2), D17(RS3), D98, J01, J05, J07, J08, J09, D16
7. Hepatorenal pouch.	267	208	D06(RS2), D08(RS2)
8. Rectouterine pouch (pouch of Douglas).	267	208	D13(RS3), J17(RS3), J10
9. Peritoneal recesses.	268	204	D10

Short Answers

1. Ileocecal folds.	—	205	J09(RS2)
2. Ovarian bursa.	—	—	J09(RS2)
3. Lesser omentum—contents.	258	200	J06, J10

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4. Mesentery—attachments, borders and contents.	259	205	J17(RS3), J01
5. Root of mesentery.	259	205	J12
6. List the structures crossed by the root of the mesentery.	259	205	D12, D13
7. Structures attached to the root of the transverse mesocolon.	260	205	J14
8. Name the contents of the transverse mesocolon.	260	205	D11
9. Sigmoid mesocolon.	260	206	D14
10. Name the peritoneal ligaments/folds attached to the liver.	260	198	D13
11. Name the umbilical fold and mention their contents.	263	199	J14
12. Epiploic foramen (draw and label/ boundaries).	263	200	D05(RS2), J06(RS2), D07(RS2), J10(RS2), J18(RS3), J98, J08, J12, D12, J15
13. Omental bursa.	264	201	J08(RS2)
14. Morrison's hepatorenal pouch.	267	208	D18(RS3)
15. Rectouterine pouch (Douglas pouch)— parts, clinical importance.	267	208	J05(RS2), J12(RS3), J15
16. Name the paraduodenal recesses and mention its applied importance.	268	204	J13
17. Peritoneal recesses in relation to cecum and appendix.	269	205	J99

■ CHAPTER 49: ABDOMINAL PART OF ESOPHAGUS AND STOMACH

Long Essay

1. Describe stomach under following headings: (a) Position, (b) Parts, (c) Gross features, (d) Peritoneal and visceral relations, (e) Blood supply and venous drainage, (f) Nerve supply, (g) Lymphatic drainage, (h) Development and congenital anomalies, (i) Microscopic structure, (j) Applied anatomy.	274	211	J07(RS2), J14(RS3), J99, D00, J05, D06, D08, D09, D11, J13, D13, D14
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Short Essays

1. Describe the parts and lymphatic drainage of the stomach.	274	211	D16
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2. Stomach bed.	276	213	J06(RS2), J15(RS3), J16(RS3), D02 J12(RS3)
3. Blood supply and lymphatic drainage of stomach.	277	213	
4. Stomach—blood supply.	277	213	J08(RS2), D10(RS2), D14(RS3)
5. Stomach—lymphatic drainage.	277	215	D08(RS2), D09(RS2), D03

Short Answers

1. Name the types of stomach.	—	—	D12
2. Fundus of stomach.	275	213	J15
3. Name the peritoneal folds attached to the stomach.	276	212	D15
4. Structures in stomach bed.	276	213	D99, J08, J10, D10
5. Blood supply of stomach.	277	213	D16(RS3), D18(RS3)
6. Lymphatic drainage of stomach.	277	215	J11(RS2)

■ CHAPTER 50: SMALL AND LARGE INTESTINES

Long Essays

1. Describe the Duodenum under the following headings: (a) Position and parts, (b) Peritoneal and visceral relations, (c) Blood supply, (d) Development.	285	216	D16
2. Describe second part of duodenum under following headings: (a) Relations, (b) Internal features, (c) Arterial supply, (d) Development, (e) Applied anatomy	286	216	D99

Short Essays

1. Describe the parts, peritoneal attachments and blood supply of the duodenum.	285	216	D13, D15
2. Second part of the duodenum—extent, relations, blood supply and development.	286	216	J06(RS2), J12(RS3), J15(RS3), J18(RS3), J04, D06
3. Meckel's diverticulum.	290	220	D05(RS2), J13(RS3)
4. Blood supply of colon (large intestine).	292	225	J13(RS3), J00

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5. Cecum (parts, position and blood supply).	294	222	D06(RS2), D11(RS3), J13(RS3), J12, J13
6. Vermiform appendix—situation, positions, peritoneal relations, blood supply, microscopic structure and applied anatomy.	295	223	J06(RS2), D10(RS2), D12(RS3), J98, D99, J08, D08, J11, J14
Short Answers			
1. Interior of second part of duodenum.	287	217	J12
2. Suspensory ligament of duodenum/ ligament of Treitz.	288	217	J14(RS3), D14(RS3), D00, J01, D04, J15
3. What is suspensory ligament of the duodenum and what does it represent embryologically?	288	217	J14
4. Blood supply of second part of duodenum.	288	217	J09
5. Duodenal cap.	289	229	D00
6. Meckel's diverticulum.	290	220	D12(RS3), D16(RS3), D01, D03, D10
7. Parts of large intestine.	291	221	J06(RS2)
8. Taenia coli.	292	222	J00, D00
9. Appendices epiploicae.	292	222	J09
10. Difference between large intestine and small intestine.	293	222	D12(RS3), D16
11. Types of cecum.	—	223	J10
12. Name the features in the interior of the cecum.	294	223	D16
13. Ileocecal valve.	295	223	D18(RS3)
14. Vermiform appendix—positions (normal and abnormal).	295	223	J07(RS2), J15(RS3), D17(RS3), D00, D04, D11, D15
15. McBurney's point and its applied importance.	298	224	J08(RS2), J15(RS3), J01, D02, D04, J09, D09

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16. Sigmoid colon.

299

227

D12(RS3)

CHAPTER 51: LARGE BLOOD VESSELS OF THE GUT**Long Essay**

1. Describe portal vein under following headings: (a) Formation, (b) Termination, (c) Course and tributaries, (d) Portacaval anastomosis with systemic veins, (e) Development, (f) Applied anatomy.

Short Essays

1. Celiac trunk (relations, branches and viscera supplied).

2. Superior mesenteric artery—origin, course and branches.

3. Inferior mesenteric artery.

4. Portal vein—formation, course, relations, tributaries and termination.

5. Portacaval anastomoses—sites and applied anatomy.

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9. Sites of portosystemic anastomoses.	310	257	J06(RS2), J99, D11
10. What is the clinical significance of portacaval anastomosis?	310	257	D15
11. Caput medusae.	310	257	D00

CHAPTER 52: EXTRAHEPATIC BILIARY APPARATUS

Long Essay

1. Describe the extrahepatic biliary apparatus. 315 240 J12(RS3)

Short Essays

1. Gallbladder. 316 241 J98, D98, D99,
D01, D11

2. Bile duct (formation, termination and relations). 317 242 J11(RS2),
D11(RS3), J00,
J01, J03, D05

Short Answers

1. Structures forming extrahepatic biliary apparatus. 315 241 J06

2. What are the parts of the gallbladder? 316 241 J13, D15

3. Location of fundus of gallbladder. 316 241 J07

4. Ampula of Vater. 317 243 J11

5. Sphincters related to bile and pancreatic duct. 318 242 J08

CHAPTER 53: SPLEEN, PANCREAS AND LIVER

Long Essays

1. Describe spleen under following headings: (a) Situation, size and shape, (b) Borders and surfaces, (c) Peritoneal and visceral relations, (d) Ligaments, (e) Blood supply, (f) Development, (g) Microscopic structure, (h) Functions, (i) Applied anatomy. 322 247 D07, J08

2. Describe pancreas under following headings: (a) Position, (b) Gross features (parts), (c) Peritoneal and visceral relations, (d) Ducts, (e) Blood supply, (f) Lymphatic drainage, (g) Development, (h) Microscopic anatomy, (i) Applied anatomy. 327 244 D06(RS2),
J11(RS2),
D15(RS3), J04,
J11, D12

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3. Describe gross anatomy of head of pancreas under the following headings: (a) Situation and gross features, (b) Relations, (c) Blood supply, (d) Development. 327 244 D10(RS2), J98

4. Describe the gross anatomy of liver with its applied aspects. 332 231 D14(RS3)

Short Essays

1. Spleen—situation, surfaces (visceral), relations, blood supply. 322 247 D09(RS2), J02,
D04, D05, D06,
J09

2. Ligaments of spleen—attachments, contents and development. 323 247 J06(RS2),
J09(RS2), J04

3. Ligaments and relations of spleen. 323 247 J15(RS3),
J06

4. Hilum of the spleen—contents. 324 247 J10(RS2), J12

5. Head of pancreas. 327 244 D10

6. Relations of pancreas. 327 245 D14

7. Blood supply and development of pancreas. 329 246 J06, J09

8. Porta hepatis—location, contents and applied anatomy. 333 235 D06

9. Inferior surface of liver. 335 235 J06, J09

Short Answers

1. Ligaments (peritoneal) of spleen—attachments, contents. 323 247 D06(RS2),
D10(RS2),
D16(RS3), J98,
D99, J12, D16

2. Visceral surface of spleen (relations, impressions). 324 247 J01, J07, D08,
D15

3. Splenic circulation. 324 248 J13(RS3)

4. Name the parts and secretions of the pancreas. 327 244 D13

5. Uncinate process of pancreas. 328 244 J15

6. Porta hepatis. 333 235 J06(RS2), D05

7. Ligaments (supports) of liver. 261, 333 236 D10

8. Name the lobes of liver. 333 235 J15

9. Anatomical and physiological lobes of liver. 333, 336 235 D99

10. Bare areas of liver. 334 234 J07(RS2),
J08(RS2),
D18(RS3), J99,
J01, D04, J07,
J08, D14

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11. Boundaries of bare area of liver.	334	234	D11
12. What are the embryological remnants associated with the liver?	334	238	D16
13. <u>Segments of liver.</u>	336	236	J13(RS3)
CHAPTER 54: KIDNEY AND URETER			
Long Essays			
1. Describe kidneys (right and left) under following headings: (a) Location, size, borders and surfaces (general features), (b) Coverings, (c) Relations (visceral and peritoneal), (d) Blood supply, (e) Development and congenital anomalies, (f) Applied anatomy.	341	259	D07(RS2), D05, J07, J10, J12, J14
2. Describe the coverings, microstructure (diagram only) and development of (HIST). kidney.	343, 305 260, 266, D13(RS3) (EMB)	267	252
Short Essays			
1. Relations of right kidney.	342, 343 261	J07(RS2), J03, D14	
2. Relations of left kidney.	342, 343 261	J15	
3. Anterior relations of (right/left) kidney.	343 262	J08(RS2)	
4. Coverings of kidney.	343 260	J98, D03	
5. Renal fascia.	343 260	J01	
6. Vascular segments of kidney.	345 264	D08	
7. <u>Ureter—formation, course, relations and constrictions.</u>	348 267	J14(RS3), J15(RS3), J18(RS3), D12	
8. Left ureter (in females).	348	267	J02
9. Right ureter (in females).	348	267	D00, D04, D09
Short Answers			
1. Posterior relations of kidney.	342	261	J05
2. Posterior relations of left kidney.	342	261	D15(RS3), D13
3. Muscles related to posterior surface of right kidney.	342	261	D99
4. Labeled diagram of anterior surface of right kidney.	342	262	D00
5. Relations of anterior surface of right kidney.	343	262	D10(RS2)
6. Anterior relations of left kidney.	343	262	D09

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7. Coverings of kidney.	343	260	J07, D10, J13
8. Segments of kidney.	345	264	J15(RS3)
9. <u>Constrictions of ureter—bony landmarks.</u>	349	267	J11, D11, J12, D13, J12(RS3)
10. Pelvic part of ureter.	351	267	
CHAPTER 55: SUPRARENAL GLAND AND CHROMAFFIN SYSTEM			
Long Essay			
1. Describe suprarenal glands under following headings: (a) Location and gross features, (b) Relations, (c) Blood supply, (d) Development.	356	268	J01, D04
Short Essay			
1. Suprarenal glands (right/left)—position, coverings, relations, blood supply, development, applied anatomy.	356	268	D05(RS2), J11(RS2), D18(RS3), D98, J05, J06, J07, D08, D15
Short Answers			
1. Layers of suprarenal cortex and hormones secreted by each layer.	358	268	D09(RS2)
2. Blood supply of suprarenal gland (arterial supply and venous drainage).	358	269	J06(RS2), J09(RS2), J09, J12, J13
CHAPTER 56: DIAPHRAGM			
Long Essay			
1. Describe the thoracoabdominal diaphragm under following headings: (a) Attachments, (b) Openings and structures passing through, (c) Actions and nerve supply, (d) Applied anatomy, (e) Congenital anomalies.	361	35	J16(RS3), J18(RS3), J13
Short Essays			
1. Describe the attachments and major openings of the diaphragm.	361	35	D13
2. Attachments of respiratory diaphragm.	361	35	J11
3. Major openings in the thoracic diaphragm.	363	36	J06(RS2), J11(RS3), J99
Short Answers			
1. Origin of diaphragm.	361	35	D07(RS2)

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2. Central tendon of diaphragm.	363	35	D01
3. Openings (major and minor) of diaphragm and structures passing through them.	363	36	J08(RS2), J09(RS2), D16(RS3), J03, J04, J05, D07
4. Name the structure entering the abdomen under the median, medial and lateral arcuate ligaments.	363	36	J14
5. Structures passing through aortic opening in diaphragm at level of 12th thoracic vertebra.	363	36	D06(RS2), J08, J12
6. Mention the structures passing through the vena caval hiatus of the diaphragm.	363	36	D10
7. Name the structures passing through esophageal opening in diaphragm.	363	36	D11
8. Nerve supply of diaphragm.	363	38	J05(RS2), D10(RS2), J98, D03
9. Root value and distribution of phrenic nerve.	363 (175- Vol-3)	38	D02
10. Diaphragmatic hernias.	364	38	J12

CHAPTER 57: POSTERIOR ABDOMINAL WALL

Short Essays

1. Abdominal aorta—labeled diagram, branches.	367	275	J06, J10
2. Renal artery and its development.	368	277	D10
3. Inferior vena cava—formation, tributaries and termination.	369	279	J16(RS3), D15
4. Left renal vein.	370	280	D00
5. Iliopsoas.	371	274	J10(RS2)
6. Quadratus lumborum.	372	274	J99, D07
7. Thoracolumbar fascia.	373	272	J18(RS3), J03, J12
8. Lumbar plexus—formation and branches.	373	323 (IBSANT1)	D12(RS3), D06, J11
9. Lumbosacral trunk.	374	294	D14
Short Answers			
1. Name the branches of abdominal aorta and their level of origin.	368	276	J15(RS3), D14
2. Left renal vein.	370	280	D05(RS2)

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3. Tributaries of left renal vein.	370	280	D11
4. Cisterna chyli.	371	285	D14
5. Mention the attachment of thoracolumbar fascia.	373	272	D00
6. Lumbar sacral trunk.	374	294	J13(RS3)
7. Celiac plexus.	375	283	J01, D04, J05

CHAPTER 58: PERINEUM

Long Essay

1. Describe ischiorectal (ischioanal) fossa under following headings: (a) Boundaries and recesses, (b) Contents, (c) Applied anatomy.

Short Essays

1. Perineal body.	382	191	D16(RS3), D98, J02, D04
2. Ischiorectal (ischioanal) fossa—boundaries, contents and applied anatomy.	383	190	J12(RS3), D05(RS2), J09(RS2), J11(RS2), D15(RS3), D16(RS3), D18(RS3), J98, D98, J02, D04, D05, D12, D14, J15
3. Deep perineal pouch—boundaries and contents.	387	188	D99, J01, J09, D09, D12
4. Perineal membrane—attachments, structures piercing.	388	188	D09(RS2), D12(RS3), D17(RS3), J01, D07, D10
5. Urogenital diaphragm.	388	189	J10, J15
6. Describe the attachments and structures piercing the female perineal membrane.	388	188	J14
7. Superficial perineal pouch—boundaries and contents.	389	186	J05(RS2), D10(RS2), J17(RS3), D02, D03, J12, J13
8. Pudendal canal.	394	190	D05(RS2), J14(RS3), J15(RS3), D02, J07, J09, J10

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9. Pudendal nerve.	395	192	J06(RS2), D01, D03
Short Answers			
1. Perineal body (muscles attached).	382	191	D05(RS2), J10(RS2), D15(RS3), J08, D14 D09, D16
2. Ischiorectal (ischioanal) fossa—walls and contents and subdivisions.	383	190	
3. Perineal membrane (attachments).	388	188	J12(RS3), D15
4. Why does extravasated urine not enter the thigh under the collis fascia?	389	162	D13
5. Urogenital diaphragm—muscles forming and structures piercing.	388	189	J07(RS2), D14(RS3)
6. Contents of superficial perineal pouch.	389	187	J09(RS2), D17(RS3), J08
7. Pudendal canal—boundaries and contents.	394	190	D15
8. Pudendal nerve (course).	395	192	D11(RS3), D12
9. Branches of internal pudendal nerve.	395	193	J07(RS2), D09
10. Pudendal nerve block.	395	193	J05(RS2)

CHAPTER 59: PRELIMINARY CONSIDERATIONS OF BOUNDARIES AND CONTENTS OF PELVIS

None

CHAPTER 60: URINARY BLADDER AND URETHRA

Long Essay

1. Describe urinary bladder under following headings: (a) Position, (b) Capacity, (c) Parts, (d) Surfaces and borders, (e) Peritoneal and visceral relations, (f) Ligaments and supports, (g) Blood supply, (h) Nerve supply, (i) Development, (j) Applied anatomy.

Short Essays

1. Urinary bladder—surfaces, labeled diagram, supports, blood supply, nerve supply, lymphatic drainage, development.
2. Describe the parts, peritoneal relations and interior of the urinary bladder.

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3. Trigone of bladder—boundaries, structure, applied anatomy.	406	309	D15(RS3), J00, J02, J04, D04, D08, J12
4. Nerve supply and development of urinary bladder.	407	310	D10(RS2)
5. Male urethra (parts with their developments).	408	311	D12(RS3), D01, J08
6. Prostatic part of urethra—length, course, features, structures opening.	409	312	J98, D98, J01, D07

Short Answers

1. Supports of urinary bladder.
2. Trigone of urinary bladder.
3. Nerve supply of urinary bladder.
4. Male urethra—parts.
5. Prostatic urethra.

CHAPTER 61: FEMALE REPRODUCTIVE ORGANS**Long Essay**

1. Describe uterus under following headings: (a) Position (normal axis) and parts, (b) Gross anatomy, (c) Peritoneal reflections, (d) Relations, (e) Supports, (f) Blood supply, (g) Development, (h) Applied anatomy.

Short Essays

1. Ovarian fossa.
2. Ovary—position, parts, surfaces, relations, ligaments, blood supply.
3. Ovary—relations and histology.
4. Fallopian/uterine tube (parts and development).
5. Name the parts of the uterus and explain the supports of the uterus.
6. Ligaments of uterus.
7. Broad ligament of uterus—attachments and contents.

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8. Uterus—blood supply and lymphatic drainage.	422	328	D08
9. Supports of uterus and their applied importance.	423	327	J08(RS2), D17(RS3), J18(RS3), D00, J02, D04, D07, D10, D15

Short Answers

1. Ovarian fossa (relations).	414	322	J10, J14, J15
2. Mesovarium.	415	321	J11
3. Fallopian (uterine) tube—parts and blood supply.	417	324	J06(RS2), D99, D09, D16
4. Enumerate the parts of uterus and fallopian tube.	420, 417	325, 324	D12(RS3)
5. Tubectomy.	419	325	D11(RS3), J08
6. Positions and parts of uterus.	419	325	D06(RS2)
7. Normal position of uterus.	419	326	J11
8. Uterine axis.	419	326	J14(RS3)
9. Name the ligaments attached to the cervix of the uterus.	421	327	D16
10. Broad ligament of uterus—contents.	422	327	J05(RS2), D16(RS3), D12
11. Course and branches of uterine artery.	422	292	J14(RS3)
12. Four supports of uterus.	423	328	J15
13. Uterosacral ligament.	425	328	J13(RS3)
14. Vagina.	426	329	J13(RS3)

■ CHAPTER 62: MALE REPRODUCTIVE ORGANS

Long Essay

1. Describe prostate gland under following headings: (a) Coverings (capsule), (b) Parts (lobes), (c) Relations, (d) Blood supply, (e) Age changes, (f) Applied anatomy (surgical importance).	435	316	J09(RS2), D11(RS3)
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Short Essays

1. Prostate—location (position), capsule (coverings), lobes (parts), blood supply, age changes and applied anatomy.	435	316	D05(RS2), D06(RS2), D09(RS2), J13(RS3), D00, J06, D06, J14, D16
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2. Lobes of prostate gland.	436	317	D14(RS3), D15(RS3)
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Short Answers

1. Vas deferens.	433	314	J09(RS2)
2. Vasectomy.	435	316	D00

■ CHAPTER 63: RECTUM AND ANAL CANAL

Long Essays

1. Describe rectum and anal canal under the following headings: (a) Gross anatomy, (b) Supports, (c) Blood supply.	442, 448	296, 300	D10
2. Describe interior of rectum and anal canal. Add a note on its: (a) Development, (b) Applied anatomy.	444, 448	298, 300	D08(RS2)
3. Describe anal canal under following headings: (a) Extent, (b) Development/embryological origin, (c) Gross anatomy (d) Internal features, (e) Sphincters, (f) Blood supply, (g) Lymphatic drainage, (h) Nerve supply, (i) Applied anatomy.	448	300	J16(RS3), J17(RS3), J18(RS3), D02, J11

Short Essays

1. Rectum—extent, relations.	442	296	J07
2. Blood supply and development of rectum and anal canal.	445, 450	298, 302	J01
3. Anal canal—location, interior, blood supply, lymphatic drainage and development.	448	300	J07(RS2), D09(RS2), D98, J99, J06, D06, D09, D11
4. Describe the interior of the anal canal and add a note on its applied anatomy.	448	300	J13, D13

Short Answers

1. Valves present in the rectum/What are Houston's valves and what is its function?	444	298	D12, D16
2. Pectinate line/Hilton's line—importance.	449	301	D12(RS3), J13(RS3)
3. Anal sphincters.	449	302	D13(RS3)
4. Sphincter ani externus muscle.	449	302	D07
5. Name the causes and types of hemorrhoids in the anal canal.	451	303	D12, J14

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■ CHAPTER 64: WALLS OF PELVIS

Short Essays

1. Internal iliac artery—course and branches of distribution. 291 J15(RS3), D00

2. Describe the branches of the anterior trunk of the internal iliac artery. 291 D13

3. Nervi erigentis. 458 — J03

4. Levator ani muscle. 460 288 J12(RS3), J03

5. Pelvic diaphragm—components, attachment of muscles, openings, functions. 461 288 J13(RS3), J14(RS3), J04, D06

6. Sacrotuberous ligament. 463 155 D11

Short Answers

1. Branches of external iliac artery. — 279 J06

2. Branches of Internal iliac artery. 454 291 J05(RS2), D13(RS3), D08

3. Name the branches of the anterior division of the internal iliac artery. 454 291 D12

4. Name the branches of posterior trunk of internal iliac artery. 455 293 D14

5. Nervi erigentis. 458 — J06

6. What are the different components of the levator ani muscle? 460 288 D16

7. What are the different components of the pelvic diaphragm? 461 288 D12

8. Name the muscles forming the pelvic diaphragm. 461 288 D11

9. Sacrotuberous ligament—attachments and morphology. 463 155 D05(RS2)

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Section 6: HEAD AND NECK

■ CHAPTER 65: OSTEOLGY OF HEAD AND NECK

Short Essays

1. Superior orbital fissure. 23 32 J05

Hyoid bone. 48 30 J07(RS2), J00, J03

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Short Answers

1. Name paired bones of cranium. 4 20 J10

2. Anterior fontanel and its clinical importance. 5 34 J08

3. Bregma—labeled diagram. 5 11 J06

4. Nasion. 9 13 D17(RS3)

5. Asterion—bones meeting and venous sinus related deep to it. 12 36 D02

6. Pterion—bone meeting and its clinical importance. 12 36 D14(RS3), J00, J01, D04, J07

7. Attachments of mastoid process. 13 26 D03

8. Hard palate—bones forming. 13 148 J12(RS3), J18(RS3), J05

9. Foramen spinosum. 16 17 D16

10. Superior orbital fissure—boundaries and structures passing through (contents). 23, 26 32 J06(RS2), D06, J09

11. Mention two features of the fetal skull. 28 36 D10

12. Name foramina in middle cranial fossa. 56 16 D06(RS2)

13. Foramen ovale—structures passing through. 56 17 D11(RS3), J16(RS3), J05, J07, J08, J12

14. Foramen magnum—structures passing through. 56 17 J11(RS2), J18(RS3), D99, J04

15. Jugular foramen—structure passing through. 56 17 J02, D09

■ CHAPTER 66: SCALP, TEMPLE AND FACE

Long Essays

1. Define and name layers of the scalp. 60 Give its blood supply, nerve supply and applied anatomy. 43 J10(RS2), D00

2. Describe blood supply and venous drainage of face and add a note on applied anatomy. 71 63 D05(RS2)

Short Essays

1. Scalp—layers, blood supply and nerve supply/applied anatomy. 60 43 D07(RS2), D14(RS3), J15(RS3), D15(RS3), D16(RS3), D08

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2. Emissary veins.	62	270	J03
3. Orbicularis oculi—parts, attachments, nerve supply and actions.	66	56	D06(RS2), J13(RS3)
4. Buccinator muscle.	66	56	J15(RS3), J03, D14
5. Cutaneous innervation of face.	70	6	J08(RS2)
6. Lacrimal apparatus.	75	52	J11(RS2), D15(RS3), D16

Short Answers

1. Name the layers of scalp and mention the dangerous layer of scalp.	60	43	D06, D11, D14
2. Retromandibular vein (formation).	62	65	J16(RS3), J99
3. Sensory nerve supply of scalp.	63	45	J11
4. Nerves supplying (sensory and motor innervations) anterior quadrant of scalp.	63	45	J14
5. What is black eye? Give reasons.	63	46	J12(RS3), J00, J09
6. Buccinator muscle.	66	56	D07(RS2)
7. Platysma.	67	127	J09
8. Features of Bell's palsy.	69	303	J05(RS2)
9. Sensory nerve supply of face.	70	6	J13(RS3), D99
10. Facial vein.	72	65	D17(RS3)
11. Dangerous area of the face.	72	65	D16(RS3), J13
12. Constituents of lacrimal apparatus and their function.	75	52	D06, J13
13. Nasolacrimal duct.	76	53	D13(RS3), J16(RS3), J11

CHAPTER 67: SIDE OF NECK**Long Essay**

1. Describe the boundaries, parts and contents of posterior triangle of neck.	88	135	D12(RS3), J07
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Short Essays

1. General investing layer of deep cervical fascia.	81	121	J18(RS3), J03
2. Carotid sheath.	85	123	D08(RS2), J11(RS2), D17(RS3), D99, J00, D03
3. External jugular vein—formation, relations, tributaries and applied anatomy.	88	263	J10

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Short Answers

1. Virchow's node.	—	—	D06
2. Fascia colles.	81	121	J11
3. Contents of suprasternal space of burn.	83	121	J12
4. Pretracheal fascia.	84	122	D10(RS2)
5. Suspensory ligament of Berry.	84	—	J07
6. Contents of carotid sheath.	85	123	J05(RS2), J07(RS2), J11 D99, J15
7. Sternocleidomastoid muscle—origin, insertion, nerve supply and actions.	85	127	D13(RS3), J14(RS3), J15(RS3), J00, J12, D13, D16
8. Torticollis (wry neck).	87	128	J01, D04
9. External jugular vein—formation, termination and tributaries.	88	263	

CHAPTER 68: ANTERIOR TRIANGLE OF NECK**Short Essays**

1. Digastric triangle—boundaries and contents.	97	138	J18(RS3), D08
2. Carotid triangle.	99	139	J09
3. Carotid sinus.	100	243	D09
4. Describe the origin, course, branches and termination of the external carotid artery.	101	249	J13
5. Lingual artery.	102	251	D09(RS2)
6. Facial artery—origin, termination, course, relation and branches.	103	251	J09(RS2), J06, D07, J09
7. Ansa cervicalis—formation, labeled diagram, distribution.	104	278	J15(RS3), J16(RS3), D98, D05

Short Answers

1. Digastric triangle (contents).	97	138	J10(RS2), D98, D14
2. Draw a neat labeled diagram of boundaries and subdivisions of anterior triangle of neck.	98	138	J15(RS3) *
3. Boundaries and contents of carotid triangle.	99	139	J14(RS3), J14

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4. Branches of external carotid artery.	102	250	J06(RS2), J17(RS3), J18(RS3), J98, D08, D11, J15
5. Facial artery (branches).	103	251	J13(RS3), J05
6. Ansa cervicalis (root value, branches and distribution).	104	278	J11(RS2), J15
7. Boundaries of muscular triangles of neck.	104	135	D06

■ CHAPTER 69: PAROTID REGION

Long Essay

1. Describe parotid salivary gland under following headings: (a) Position, (b) Surfaces, borders, relations and duct, (c) Coverings, (d) Parts, (e) Contents, (f) Blood and nerve supply, (g) Applied anatomy.	108	58	D03, D07, J11, D11, J14
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Short Essays

1. Parotid duct—origin, termination, relations and structures pierced by it.	111	61	J06(RS2), J01, D05, J07
2. Parotid gland (nerve supply).	112	58	J09

Short Answers

1. Structures present within substance of parotid gland.	111	59	J09(RS2), J02, D08
2. Parotid duct (Stenson's duct).	111	61	D05(RS2), D08(RS2), D98, D16
3. Structure pierced by parotid duct before its termination.	112	61	D99
4. Trace pathway for secretomotor (parasympathetic) fibers to parotid gland.	112	62	J98, J10, D12

15

■ CHAPTER 70: TEMPORAL AND INFRATEMPORAL FOSSA

Long Essays

1. Name muscles of mastication. Describe them under following headings: (a) Origin, (b) Insertion, (c) Nerve supply, (d) Actions. Add a note on its development.	118	76	J08(RS2), J11(RS2), D13(RS3), D18(RS3), D14
2. Describe temporomandibular joint. Add a note on its applied anatomy.	123	78	D01, D10

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Short Essays

1. Temporalis—attachments, nerve supply, action.	118	76	J12(RS3), J04
2. Lateral pterygoid muscle.	118	76	D05(RS2), J17(RS3), D00
3. Maxillary artery.	121	253	J02, D04
4. Articular disk of temporomandibular joint.	124	78	J00
5. Movements of temporomandibular joint and muscles causing them.	126	80	D10(RS2), D15(RS3)
6. Lingual nerve—origin, course and distribution.	129	94	D12
7. Otic ganglion and its connections.	131	75	J05(RS2), D17(RS3), J99, J03, J11

Short Answers

1. Muscles of mastication and their nerve supply.	118	76	J15
2. Lateral pterygoid muscle—nerve supply and actions.	118	76	J10
3. Branches of maxillary artery—1st part/3rd part.	122	254	J05, D07, J14
4. Ligaments of temporomandibular joint.	124	79	D06
5. Movements of protraction and retraction of mandible.	126	80	J07(RS2)
6. Branches of mandibular nerve.	128	74	D01
7. Enumerate the muscles supplied by mandibular nerve.	129	74	J12
8. Auriculotemporal nerves.	129	74	D15(RS3)

■ CHAPTER 71: SUBMANDIBULAR REGION

Short Essays

1. Hyoglossus muscle.	135	91	J09(RS2), J98, J01, D03, D06, J15, D15
2. Submandibular salivary gland—location, parts, relations and nerve supply.	137	82	J13, D15
3. Submandibular ganglion.	139	95	D12(RS3)

Short Answers

1. Digastric muscle—origin, insertion and nerve supply.	135	86	D10(RS2), J00
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2. Submandibular duct.	138	84	D15(RS3), D12
3. Mention the secretomotor supply of submandibular salivary gland.	139	84	D10, J15
4. Submandibular ganglion.	139	95	D09
5. Secretomotor fibers of submandibular ganglion.	139	95	D14(RS3)

CHAPTER 72: STRUCTURES IN THE NECK

Long Essay

1. Describe thyroid gland under following headings: (a) Position, (b) Parts, (c) Capsule and ligaments, (d) Gross features, (e) Relations, (f) Blood supply and venous drainage, (g) Histology (microscopic anatomy), (h) Development, (i) Applied anatomy.	144	237	D06(RS2), D10(RS2), D11(RS3), J13(RS3), J16(RS3), J17(RS3), J99, D02, J03
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Short Essays

1. Describe the position, parts, relations and coverings of the thyroid gland.	144	237	D18(RS3), D13
2. Thyroid gland—blood supply.	147	239	D11
3. Parathyroid glands.	149	242	J01, J05
4. Internal jugular vein (tributaries).	158	261	D01
5. Submandibular group of lymph nodes.	163	7	D02
6. Styloid apparatus.	165	—	J99, J04, D08

Short Answers

1. Labeled diagram of thyroid gland.	145	237	J05
2. Thyroid gland—blood supply and venous drainage.	147	239	D15(RS3), D08
3. Blood supply to isthmus of thyroid.	147	239	J07(RS2)
4. Internal jugular vein—tributaries.	158	261	J05(RS2), J10(RS2), D09, J15
5. Name the tributaries of the left brachiocephalic vein.	159	113 (IBSANT2)	D10
6. Features of Horner's syndrome.	161	315	J12(RS3), D18(RS3), D01
7. Styloid apparatus.	165	—	J14(RS3)
8. Styloid process of temporal bone.	165	26	D05(RS2), D15(RS3)

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CHAPTER 73: PREVERTEBRAL AND PARAVERTEBRAL REGION

Short Essays

1. Trachea.	175	182	D02
2. Atlantoaxial joint.	179	39	D99
1. Cervical pleura.	173	—	D03
2. Type and movements at atlanto-occipital joint.	178	40	J02

CHAPTER 74: BACK OF NECK

Short Essays

1. Suboccipital space (triangle)— boundaries and contents.	186	144	J06(RS2), D11(RS3), J09
2. Suboccipital nerve.	186	145	

Short Answers

1. Suboccipital triangle.	186	144	J08(RS2), D09(RS2), J01, D04
2. Suboccipital nerve.	186	145	

CHAPTER 75: CONTENTS OF VERTEBRAL CANAL

Short Essays

1. Filum terminale.	190	340	J12
2. Cauda equina.	192	117	D02

Short Answers

1. Modifications of piamater.	190	340	D16
2. Ligamentum denticulatum.	190	116	D10(RS2), J17(RS3)
3. Filum terminale.	190	340	J11(RS2), D11(RS3), J18(RS3), J06, D12
4. Cauda equina.	192	117	D08, D16

CHAPTER 76: CRANIAL CAVITY

Long Essay

1. Classify dural venous sinuses. Describe cavernous sinus under following headings: (a) Relations, (b) Tributaries, (c) Communications, (d) Applied anatomy.	199	265, 267	J05(RS2), J18(RS3), J98, J02, D06, J10, D13, D16
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Short Essays			
1. Falx cerebri.	196	101	D08(RS2), D14
2. Cavernous sinus—situation, tributaries and structures within.	199	267	J07(RS2), D08(RS2), J08
3. Pituitary gland—position, parts and secretions.	204	232	D12
Short Answers			
1. Name the cranial dural folds.	196	101	J13
2. Falx cerebri.	196	101	D06(RS2), J11
3. Venous sinuses present in falx cerebri.	197	101	J06
4. Name the dural venous sinuses related to tentorium cerebelli.	197	102	D14
5. Name paired dural venous sinuses.	199	267	D11
6. Name the structures present in the lateral wall of the cavernous sinus.	200	268	J13
7. Cavernous sinus—tributaries of cavernous sinus.	200	268	D05(RS2), J04
8. Superior sagittal sinus.	202	265	D12(RS3)
9. Straight sinus—formation, termination and applied anatomy.	203	266	D11(RS3), J07, D09
10. Sigmoid sinus.	203	267	D09(RS2), D12
11. Blood supply of hypophysis.	205	235	D07(RS2)
12. What is hypothalamohypophyseal portal system?	206	235	J14

CHAPTER 77: CONTENTS OF THE ORBIT

Long Essay

1. Describe extraocular muscles under following headings: (a) Origin, (b) Insertion, (c) Relations, (d) Actions, (e) Nerve supply, (e) Applied anatomy. Discuss the movements of eyeball.	213	186	J15(RS3), J16(RS3), J04, J05, J09, J15
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Short Essays

1. Explain the attachments, action and nerve supply of the recti muscles of the eyeball.	214	186	J14
2. Oblique muscles of eyeball, their origin, insertion, action and nerve supply.	215	186	D16(RS3)

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3. Ciliary ganglion—type, location, connections (roots, branches).	220	194	D10(RS2), J13(RS3), D00, D01, J04, D07, D11, D16
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Short Answers

1. Name extraocular muscles and give their nerve supply.	213	186	J02, D13, D15
2. Lateral rectus muscle of eye.	220	186	J11
3. Superior oblique muscle of the eye (nerve supply and action).	215	186	J10(RS2), J99, J10, D12
4. Nerve supply and actions of inferior rectus muscle of eyeball.	215	186	D14
5. Levator palpebrae superioris (nerve supply).	215	186	D15(RS3)
6. Ciliary ganglion (secretomotor fibers).	220	194	J16(RS3)

CHAPTER 78: MOUTH AND PHARYNX

Long Essays

1. Describe muscles, nerve supply, development and congenital anomalies of soft palate.	231	150	D09
2. Name the muscles of the soft palate. Give (a) Origin, (b) Insertion, (c) Nerve supply of levator veli palatini muscle. Describe the movements of soft palate. Add a note on development of soft palate.	231	150	J09(RS2)
3. Name the different types of tonsils. Describe palatine tonsil under following headings: (a) Position, (b) Blood supply, (c) Relations, (d) Microscopic anatomy, (e) Development, (f) Applied anatomy.	237	171	J12(RS3)
4. Name the muscles of pharynx. Give: (a) Origin, (b) Insertion, (c) Nerve supply, (d) Actions, (e) Relations of superior constrictor muscle of pharynx. Add a note on its surgical anatomy.	241	168	D07(RS2)

Short Essays

1. Soft palate.	231	149	J99
2. Muscles of soft palate, attachments, nerve supply and action.	233	150	D11(RS3), J13

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3. Mention the subdivisions of the pharynx and explain the nasopharynx.	237	165	J13
4. Nasopharynx.	236	166	D02
5. Palatine tonsil—relations, blood supply and applied anatomy.	237	172	J10, D12
6. Muscles of pharynx.	241	168	J08(RS2) ✓
7. Constrictors of pharynx.	241	168	J12
8. Inferior constrictor of pharynx	242	168	D08
9. Auditory tube—length, extent, relations and functions.	244	222	J98, J02, D04, D07

Short Answers

1. Name muscles of soft palate with nerve supply.	233	150	J10, D15
2. Structures forming Waldeyer's ring.	237	173	J01, D04, D07
3. Location and content of the tubal tonsil.	237	167	D13
4. Openings in nasopharynx.	237	166	J05
5. Blood supply and lymphatic drainage of tonsil.	238	172	D09(RS2), J99, D14
6. Killian's dehiscence.	243	171	J09
7. Nerve supply of pharynx.	243	170	J04
8. Give the dimensions and functions of auditory tube.	244	222	J12
9. Location of openings of auditory tube.	244	222	D05

CHAPTER 79: NOSE AND PARANASAL SINUSES**Short Essays**

1. Nasal septum—formation, blood supply and nerve supply.	250	156	D07(RS2), J17(RS3), J08, J10, J12, D14
2. Lateral wall of nasal cavity—features, blood supply and innervations.	251	156	J14(RS3), J05, D10, D13, J14
3. Middle meatus of nose.	253	157	D05(RS2) ✓
4. Maxillary air sinus.	255	160	J05(RS2), J06(RS2), D11
5. Pterygopalatine ganglion.	258	302	J10(RS2)
Short Answers			
1. Components of nasal septum.	250	156	J14
2. Blood supply of nasal septum.	250	158	J10(RS2) ✓
3. Little's area.	250	160	D16

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4. Middle meatus of nose (osteomeatal complex).	253	157	D18(RS3), D98, D03
5. Structures opening in middle meatus of nose.	253	157	D06(RS2), J08, D09, D16
6. Name the paranasal air sinuses opening into middle meatus of nose.	253	157	D15
7. Frontal sinus.	255	160	D17(RS3) ✓
8. Maxillary sinus.	255	160	D14(RS3) ✓
9. Pterygopalatine fossa—contents.	257	—	D02
10. Pterygopalatine ganglion.	258	302	J09

CHAPTER 80: LARYNX**Long Essays**

1. Describe the <u>cartilages and muscles of larynx.</u>	263	174	D15(RS3) ✓
2. Describe the <u>intrinsic muscles of larynx</u> with applied aspects.	267	179	D14(RS3)
3. Name <u>intrinsic muscles of larynx</u> . Give (a) Origin, (b) Insertion, (c) Nerve supply, (d) Actions of cricothyroid muscle. Add a note on movements of vocal cords.	267	179	D08(RS2)

Short Essays

1. Thyroid cartilage.	263	174	J15(RS3) ✓
2. Interior (Cavity) of larynx.	266	177	D18(RS3), D15
3. Vocal cords (folds).	266	177	J98, J01, D07
4. Muscles of larynx.	267	179	J11
5. Cricothyroid muscle.	268	180	D98

Short Answers

1. Epiglottis.	264	174	D05(RS2)
2. <u>Inlet of larynx.</u>	266	177	D12(RS3) ✓
3. Rima glottidis (parts and muscles which open it).	266	177	J02
4. Piriform/pyriform fossa—boundaries and applied importance.	267	—	D13
5. Enumerate only intrinsic muscles of larynx.	268	179	J09
6. Cricothyroid muscle—nerve supply and action.	267	180	D10
7. Posterior cricoarytenoids—nerve supply and actions.	267	180	D01, D12

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8. Name the abductors of vocal cord.	268	180	D16(RS3), J06(RS2), D10(RS2), D02, D03, J05, J14
9. Larynx—nerve supply (sensory and motor).	271	181	

CHAPTER 81: TONGUE**Long Essays**

1. Describe the tongue under following headings: (a) Parts, (b) Gross anatomy, (c) Dorsum of tongue, (d) Muscle, (e) Nerve supply, (f) Blood supply, (g) Lymphatic drainage, (h) Development, (i) Applied anatomy.	274	88	D98, J00, D08, J12
2. Name muscles of tongue. Give: (a) Origin, (b) Insertion, (c) Nerve supply, (d) Actions. Add a note on its development.	276	91	D09(RS2)

Short Essays

1. Name the muscles of the tongue and explain their actions and nerve supply.	276	91	D12
2. Tongue—lymphatic drainage.	278	97	D08(RS2), D12(RS3)
3. Tongue—lymphatic drainage and development.	278	97	J11(RS2)
4. Tongue—development and nerve supply.	278	94	D16(RS3)
5. Tongue—sensory and motor nerve supply.	278	94	D06(RS2), D01, J15

Short Answer

1. Tongue—innervation/nerve supply (sensory).	278	94	J08(RS2), J09(RS2), D15(RS3), D13
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CHAPTER 82: EAR**Long Essay**

1. Describe the medial and lateral walls of middle ear and add a note on its applied aspects.	290	218	D15
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Short Essays

1. Tympanic membrane.	285	218	D09(RS2), D98, D00, J12, D12
2. Tympanic cavity.	288	216	D03

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3. Walls of middle ear.	288	218	D13(RS3), J07(RS2)
4. Posterior wall of middle ear.	289	220	D07(RS2)
5. Lateral wall of middle ear.	290	218	J12(RS3)
6. Medial wall of middle ear.	290	220	J07, J10

Short Answers

1. Name the components and medial relations of the tympanic membrane.	285	216	J13
2. Draw only medial wall of middle ear cavity.	289	221	J09
3. Contents of middle ear.	290	216	J00, D01

CHAPTER 83: EYEBALL**Short Essay**

1. Cornea.	300	200	D05(RS2)
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Short Answer

1. Name the muscles of the eyeball.	302	203	D10
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CHAPTER 84: MISCELLANEOUS

None

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Section 7: BRAIN**CHAPTER 85: INTRODUCTION**

None

CHAPTER 86: MENINGES OF BRAIN AND CEREBROSPINAL FLUID**Short Essay**

1. Subarachnoid cisterns.	22	105	J15(RS3)
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Short Answer

1. Mention function of arachnoid granulations.	20	107	D05
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CHAPTER 87: SPINAL CORD**Short Essay**

1. Transverse section of spinal cord showing ascending and descending tracts.	37, 38	364	J07
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Short Answers

1. Cross section of spinal cord to show ascending and descending tracts (only labeled diagram).	37, 38	364	D05(RS2)
2. Sensation carried by posterior column of spinal cord.	42	371	D06

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■ CHAPTER 88: CRANIAL NERVES

Long Essays

1. Describe oculomotor nerve under 61 287 D02, D04
 following headings: (a) Origin, (b) Course, (c) Relations, (d) Distribution, (e) Applied anatomy.

2. Describe facial nerve under following 70 299 J08

Short Essays

1. Describe the extracranial course, distribution of the facial nerve. 71 300 D12
 2. Facial nerve in face. 71 300 J05
 3. Left recurrent laryngeal nerve. 83 309 D99

Short Answers

1. Enumerate the cranial nerves taking 50 350 D14
 origin from medulla oblongata. 59 — D13(RS3)
 2. Accommodation reflex. 62 287 D99
 3. Muscles supplied by third cranial (oculomotor) nerve. 62 287 D06(RS2)
 4. Muscles affected in oculomotor palsy. 62 290 J13
 5. Name the branches of the trigeminal 68 nerve in the face. 68 —
 6. Branches of facial nerve on face. 71 300 D07
 7. Nerve to stepenius. 72 300 J07(RS2)
 8. Chorda tympani nerve (structures supplied). 72 301 J15(RS3), D05, J09
 9. Branches of hypoglossal nerve. 87 312 D09

■ CHAPTER 89: BRAINSTEM

Long Essay

1. Draw a diagram of transverse section 94 of medulla oblongata at sensory 352 J98

Short Essays

1. Transverse section of medulla at various 94 351 D16
 levels.
 2. Draw a neat labeled diagram of 94 352 D15(RS3),
 medulla oblongata at the level of J16(RS3), D03,
 sensory decussation. J07

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3. Draw and label the transverse section 94 of medulla oblongata at the pyramidal decussation. 351 J12(RS3),
 D13(RS3), J00, J10, D15
 4. Pontine nuclei—location, connections. 97 354 J06
 5. Section of pons at mid level. 98 356 J04
 6. Medial lemniscus. 98 352 D05(RS2)
 7. Midbrain. 99 357 J09(RS2),
 J10(RS2)
 8. Transverse section of midbrain at level 100 358 D07(RS2),
of inferior colliculus (draw and label). D12(RS3),
 D14(RS3), D07
 9. Labeled diagram showing transverse 102 360 J05(RS2),
section of midbrain at level of superior
colliculus. Add a note on connections of
 red nucleus. J06(RS2),
 J08(RS2),
 J13(RS3), D00,
 J13
 10. Superior colliculus. 101 360 D17(RS3)
 11. Red nucleus—location, connections. 102 360 D11(RS3),
 J16(RS3), J09,
 J08, J12

Short Answers

1. Nucleus ambiguus. 95 381 J14(RS3)
 2. Crus cerebri. 100 358 D16(RS3)
 3. Draw transverse section of midbrain at 101 359 D09
 inferior colliculus.
 4. Red nucleus. 102 360 J17(RS3)

■ CHAPTER 90: CEREBELLUM

Short Essays

1. Cerebellum—parts of vermis (divisions) and its functions. 106 394 J14(RS3), D09
 2. Dentate nucleus—situation, shape, 109 398 J02, D04, D07
 connections and functions.
 3. Cerebellar peduncles. 110 397 J07(RS2)
 4. Superior cerebellar peduncle. 110 — J15
 5. Inferior cerebellar peduncle—parts 110 — D06(RS2),
connected, fibers passing through. J09(RS2),
 J13(RS3),
 D14(RS3), D99,
 J00, D02, J04,
 D08
 6. Functions and applied anatomy of 112 396 J10, D11
 cerebellum.

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Short Answers	106	396	D08(RS2)
1. Archicerebellum.	109	398	J10(RS2)
2. Enumerate nuclei of cerebellum.	110	—	J14
3. Mention any two afferent and efferent fibers present in the middle cerebral peduncle.	110	—	J11
4. Name the tracts in inferior cerebellar peduncle.	110	—	
CHAPTER 91: FOURTH VENTRICLE			
Short Essays	115	432	D13
1. Discuss the boundaries of the fourth ventricle.	115	433	J12(RS3), J06(RS2), D16(RS3), J99, J11, D11, D12
2. Floor of fourth ventricle (labeled diagram).	115	432	D09(RS2), J18(RS3), D16
3. Rhomboid fossa (fourth ventricle).	115	432	
Short Answers	115	432	J09
1. Rhomboid fossa—boundaries.	116	434	D08(RS2)
2. Roof of fourth ventricle.	117	429	D13
3. Formation and function of the tela choroidea.	117	406	D13
4. What is cerebral aqueduct? And what is its clinical importance?	117	406	
CHAPTER 92: CEREBRUM			
Long Essays	124	404	J13(RS3), J14(RS3), J01
1. Describe the superolateral surface of cerebral hemisphere under the following headings: (a) Lobes, (b) Sulci, (c) Gyri, (d) Functional areas, (e) Blood supply.	134	412	D09
2. Describe thalamus and its connections.	145	420	J09
3. Describe corpus callosum. Add a note to its role in cerebral asymmetry.	124 ??	404	J17(RS3)
Short Essays	122, 128	404	D13
1. Draw a neat labeled diagram to show the sulci, gyri, functional areas of the superolateral surface of the cerebrum.	124 ??	404	
2. Sulci and gyri of superolateral surface of cerebrum.	124 ??	404	

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3. Functional areas and blood supply of superolateral surface of Cerebrum	126	404	D18(RS3)
4. Lateral geniculate body.	137	416	D98
5. Caudate nucleus.	141	424	D10(RS2), D99
6. Corpus callosum.	145	420	D08(RS2), D11(RS3), D13(RS3), J17(RS3), D01, D03
7. Internal capsule.	146	421	D05(RS2), J03, D06
Short Answers			
1. Calcarine sulcus.	125	406	D11(RS3), D12(RS3), J02
2. Which are the parts of the body controlled by the paracentral lobule of the cerebrum?	127	406	J14
3. Speech areas of brain.	128	411	J15(RS3)
4. Broca's motor speech area.	128	411	D12(RS3), J02
5. Sensory speech area in the cerebrum.	128	—	D12
6. Components of basal ganglia.	141	424	D10
7. Name white fibers of cerebrum.	144	418	J11
8. Association fibers of cerebrum.	144	418	D16
9. Mention commissural fibers of cerebral hemisphere.	145	419	D01, J08
10. Corpus callosum (Parts).	145	420	D18(RS3), J15
11. Parts of internal capsule.	146	421	D05

CHAPTER 93: THIRD VENTRICLE, LATERAL VENTRICLE AND LIMBIC SYSTEM**Short Essays**

1. Third ventricle.	151	431	D17(RS3), J05
2. Describe the boundaries of the lateral ventricle.	153	429	J13

Short Answers

1. Inferior horn of lateral ventricle.	155	430	D14
2. Papez circuit of recent memory.	159	—	D09

CHAPTER 94: SOME NEURAL PATHWAYS AND RETICULAR FORMATION**Short Answers**

1. What are gray and white rami communicantes?	—	—	D13
2. Effects of upper motor neuron lesion.	162	366	D08

Contd...

CHAPTER 95: BLOOD SUPPLY OF SPINAL CORD AND BRAIN

Long Essay

1. Write diagram of circle of Willis and anterior cerebral artery, and its branches. Name areas that anterior cerebral artery supplies.

Short Essays

1. Spinal cord—blood supply. 167 345 J05(RS2),
D12(RS3),
D18(RS3)

2. Circle of Willis (circulus arteriosus). 171 444 J07(RS2),
D09(RS2),
J10(RS2),
J11(RS2), D98

3. Choroid plexus. — 429 D00

4. Short Answers

1. Basilar artery (branches). 168 445 J10(RS2),
J12(RS3),
J15(RS3)

2. Draw and label circle of Willis. 173 445 J15

3. List any four functional areas of the cerebrum supplied by the middle cerebral artery. 170 447 J14

4. Choroid plexus. — 429 J14

5. What is subarachnoid hemorrhage? — 112 J06

Mention one cause.

IBSEMB KDSN

Section 8: EMBRYOLOGY

CHAPTER 96: SOME PRELIMINARY CONSIDERATIONS

None

CHAPTER 97: GENETICS AND MOLECULAR BIOLOGY IN EMBRYOLOGY

Short Essays

1. Genetic counseling. — — D07(RS2)

2. X-chromosome. — — J08(RS2)

3. Y-chromosome. — — D08(RS2)

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Anatomy

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ANATOMY

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	IBSEMB	KDSN
4. Gene.	8	5 D15(RS3)
5. Chromosome.	11	7 J06(RS2)
6. Types/classification of chromosomes.	13	7 D13(RS3), D14
7. Karyotyping—principles and applications.	13	8 D08(RS2), J09(RS2), D15(RS3), D17(RS3), J98, J09, J13
8. Abnormalities of chromosome.	14	— J12(RS3)
9. Numerical chromosomal anomalies.	15	— J16(RS3)
10. Down's syndrome/Trisomy 21 (causes and symptoms).	15	8 J13(RS3), J14(RS3), D16(RS3), D99, D11, J14, D15
11. Trisomy 18.	15	8 J11
12. Turner's syndrome.	15	9 J10(RS2), J10
13. Klinefelter's syndrome.	15	9 J05(RS2), D07(RS2), J15(RS3), J17(RS3), D18(RS3)
14. Autosomal dominant inheritance.	16	5 J10(RS2), D11(RS3), J18(RS3)
15. Sex-linked inheritance.	17	— J99
16. Meiosis.	19	12 J15
17. Nondisjunction and its consequences.	21	8 D11(RS3), D16
Short Answers		
1. RNA—ribonucleic acid.	—	— J18(RS3)
2. X-chromosome.	—	— J12(RS3)
3. Y-chromosome.	—	— D98, J09
4. Genetic counseling.	—	— J99, D99
5. Anaphase lag.	—	— D03
6. Robersonian translocation.	—	— D18(RS3), D03
7. Aneuploidy.	—	— D03

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	IBSEMB	KDSN	
8. Chromosomal bandings.	—	—	D10
9. Write any three differences between mitosis and meiosis.	—	—	D02
10. Simian palmar crease.	—	—	D05
11. Polyploidy.	—	4	J04
12. Recessive genes.	—	5	J00, D01, D02, J03
13. Mutation.	—	5	J07(RS2), J11(RS2)
14. What is Philadelphia chromosome?	—	8	D09
15. Mendel's law of independent assortment with example.	—	473 (IBSANT3)	D16(RS3), J17(RS3)
16. Genome.	9	—	J10
17. Genetic code.	11	7	D17(RS3), J10, J12
18. Chromosome.	11	—	D06
19. Autosomes.	11	—	D06(RS2)
20. Sex chromosomes.	11	—	J00
21. Define chromosome. Give the chromosome complement of normal male and female.	11	7	
22. Mention the types of chromosomes based on centromere position.	13	—	D16
	13	—	J03
23. What is the difference between metacentric, submetacentric and acrocentric chromosomes?	13	—	J04
24. Satellite bodies.	13	8	D98, J05, J12 D15
25. Karyotyping—diagnostic importance.	13	—	J07
26. List six acrocentric chromosomes.	14	—	D01
27. Name the chromosomes with satellite bodies.	14	—	D07
28. Ring chromosome.	15	—	J00, J03, D09
29. Mention any three structural abnormalities of chromosomes.	15	—	J04
30. Name any three syndromes having trisomy.	15	—	

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	IBSEMB	KDSN	
31. Translocation.	15	4	J04, D05
32. Define genotype and phenotype.	15	5	D10(RS2), J00, J01, D04, D07, J08, D08
33. <u>Down's syndrome</u> —karyotype and clinical feature.	15	8	D05(RS2), D09(RS2), D10(RS2), J98, D02, D03, D14
34. <u>Klinefelter's syndrome</u> —karyotype, phenotype and clinical feature.	15	9	D08(RS2), J06, D98, J99, D01, D03, D10, D12, J15
35. Turner's syndrome—karyotype, phenotype, causes and clinical features.	15	9	D06(RS2), D99, D00, J02, J04, J07, D07, J12, J13, J14
36. What is pedigree analysis?	16	—	D12
37. Name any three autosomal dominant disorders.	16	5	D08
38. Autosomal dominance.	16	5	J00, J02, D10
39. Name any four X-linked inheritances.	17	—	J13
40. Mention the examples of X-linked recessive inheritance.	17	—	D09, D11
41. Recessive trait.	17	5	D06
42. Name any four autosomal recessive disorders.	17	6	D07
43. Meiosis—stages, significance.	19	12	D05(RS2), D98, J07
44. Monosomy.	21	—	D05
45. Nondisjunction.	21	8	D98, J01, J02, J03, D04, D05, J12
46. Consequences of nondisjunction.	21	8	J13
47. Trisomy.	21	8	J07(RS2)

■ CHAPTER 98: REPRODUCTIVE SYSTEM, GAMETOGENESIS, OVARIAN AND MENSTRUAL CYCLE

Short Essays

1. Spermatogenesis.
2. Capacitation.

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	IBSEMB	KDSN	
3. Oogenesis.	31	29	J09(RS2), D15(RS3) J11, J13
4. Graafian follicle (formation).	34	31	
Short Answers			D01
1. Name any three investigations for infertility.	—	—	
2. Draw and label the structure of a spermatozoon (longitudinal section).	29	25	J00, D08, J12, J15
3. Mention the chromosomal complement of spermatogonium and spermatozoa.	29	28	J02
4. Spermiogenesis (stages).	28	27	J07(RS2), D98, J03, J10, D13
5. Write diagrammatic representation of spermatogenesis.	29	—	J03
6. Capacitation.	30	51	D00
7. Write diagrammatic representation of stages in oogenesis.	32	30	D01
8. Graafian follicle (draw and label).	34	31	D08
	35	35	J15(RS3)
9. Ovulation.	37	37	J10, D12
10. Corpus luteum.			

■ CHAPTER 99: FERTILIZATION AND FORMATION OF GERM LAYERS

Short Essays

1. Fertilization and its effects.	46	49	J12(RS3), J11(RS2), J14(RS3), D99
2. Cleavage and morula.	52	54	D15
3. Trophoblast.	52	54	J05(RS2)
4. Blastocyst.	53	54	J11(RS2)
5. Amnion.	55	61	D06(RS2)
6. Primitive streak.	56	61	J16(RS3), J01, D01
7. Explain the formation of intra-embryonic mesoderm and mention the subdivisions.	56, 65	62	D12
8. Trilaminar germ disc.	57	60	D10
9. Gastrulation.	57	62	D12(RS3)

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IBSEMB KDSN

Short Answers

1. Zygosis.	—	—	J03
2. Fertilization.	46	52	D18(RS3), J08, J13, J15, D15
3. What is the acrosome reaction?	49	51	D10
4. In vitro fertilization.	51	53	D07(RS2)
5. Morula.	52	54	J00, D00, J05
6. Blastocyst.	53	54	D16(RS3), J01, D04, J06, J07, D07, D08, D14
7. Zona pellucida.	54	55	J02, J11
8. Bilaminar germ disc.	55	59	J06(RS2)
9. Prochordal plate.	56	61	D01
10. Primitive streak (formation).	56	61	J07(RS2), D98, J07, J09, D13

■ CHAPTER 100: FURTHER DEVELOPMENT OF EMBRYONIC DISC

Short Essays

1. <u>Notochord</u> —development, functions and fate.	62	66	D06(RS2), J08(RS2), J13(RS3), D14(RS3), J17(RS3), D18(RS3), D03, D05, D06
2. Mesodermal somites.	67	63	D07(RS2)
3. Septum transversum.	67	166	J01
4. Yolk sac.	67	59, 66	D08(RS2), J09
5. Umbilical cord—formation, contents.	69	90	J04

Short Answers

1. Name the derivatives of notochord.	64	66	J98, J99, J03
2. Give the structure arising from primitive streak.	65	62	D11
3. <u>Division and derivatives of intra-embryonic mesoderm</u> .	65	62	J14(RS3), J12
4. Cloacal membrane.	65	62	J00
5. Somite.	67	63	J06(RS2)
6. What is <u>septum transversum</u> and name the structure derived from it.	67	166	J18(RS3), J12

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		IBSEMB	KDSN
7. Yolk sac.	67	59, 66	J99, J07, D07, J08
8. Vitellointestinal (viteline) duct.	68	68	J17(RS3), D12
CHAPTER 101: PLACENTA, FETAL MEMBRANES AND TWINNING			
Short Essays			
1. Implantation.	74	56, 75	D13(RS3), J11 D17(RS3), J03
2. Chorionic villi—formation.	79	82	J18(RS3), D13
Short Answers			
1. What are the differences between fetal and maternal side of the placenta?	—	—	J13
2. Mention any two types of implantation with examples.	77	81	J02
3. Decidua (name three layers).	78	81	J09, D09
4. Placenta praevia.	78	85	J10(RS2)
5. Ectopic pregnancy.	78	85	D08(RS2)
6. Chorion—formation and fate.	79	61	D15(RS3)
7. Chorionic villi.	81	82	D05(RS2), J11 J08(RS2), J11
8. Name the three types of villi with structural differences in a developing placenta.	81	82	J01, D04, D07
9. Tertiary chorionic villus (labeled diagram).	83	82	D03, D05
10. Placental barrier.	86	83	D11(RS3), J04, J08
11. Functions of placenta.	86	83	D11(RS3), D98, J15
12. Name the fetal membranes.	88	—	D15
13. Amniotic fluids—formation and functions.	89	94	J99, J06
14. Contents of umbilical cord.	91	90	J08(RS2), J99, D06
15. Monozygotic twins.	93	349	D07(RS2)
CHAPTER 102: FORMATION OF TISSUES OF THE BODY			
Short Answers			
1. Name any four derivatives of endoderm.	99	—	D00, J04
2. Mention any four derivatives of mesoderm.	100	—	D02
3. Paraxial mesoderm and its derivatives.	100	63	D98, D08, D13

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		IBSEMB	KDSN
CHAPTER 103: INTEGUMENTARY SYSTEM (SKIN AND ITS APPENDAGES, MAMMARY GLAND)			
None			
CHAPTER 104: PHARYNGEAL ARCHES			
Short Essays			
1. First pharyngeal arch (derivatives, nerve of arch).	128	98	D05(RS2), D09(RS2), J14(RS3), D02, J08, J15
2. Second pharyngeal arch (derivatives).	129	102	D11(RS3), D10
3. Tubotympanic recess.	131	106	J05
4. Development of thyroid gland—description with labeled diagram and common congenital anomalies.	133	138	D15(RS3), J06, D09, J10
5. Microscopic structure and development of thyroid gland.	133	138	D06
Short Answers			
1. Derivatives of 1st pharyngeal arch, pouch and cleft.	128, 131, 130	102, 106	D16(RS3)
2. Meckel's cartilage and its fate.	128	102	D08(RS2), D09(RS2)
3. Derivatives of first pharyngeal arch.	128	98	J15(RS3)
4. Second pharyngeal arch and its derivatives.	129	102	J08(RS2)
5. Mention the mesodermal (skeletal) derivatives of hyoid (second branchial) arch.	129	102	J98, D99
6. Development of the styloid process of the temporal bone.	129	101	D05
7. Mention the derivatives of third branchial arch.	129	101	J17(RS3)
8. Development of hyoid bone.	129	101	J12(RS3), J01, D04
9. Fate of ectodermal clefts.	129	106	D07(RS2)
10. Name the muscles of first pharyngeal arch.	130	102	D14
11. Derivatives of first pharyngeal pouch.	131	106	J10(RS2), D07
12. Derivatives of third pharyngeal pouch.	131	107	D10(RS2)
13. Development of palatine tonsil.	132	107	J06(RS2)
14. Mention the development of thymus.	132	107	J98, J10, D12
15. Development of the parathyroid glands.	133	143	D09(RS2), D10(RS2), J99

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16. Thyroid gland development.	133	138	J15 D12(RS3)
17. <u>Thyroglossal duct</u>	133	138	
CHAPTER 105: SKELETAL SYSTEM AND MUSCULAR SYSTEM			
Short Essay	138	63	J11(RS2), D16(RS3), J98, D09
1. Somite.			
Short Answers	—	—	D06
1. Clinodactyly.	—	—	D06
2. Webbed neck.	—	—	D11
3. Give the parts of body somites.	138	63	D17(RS3)
4. Sclerotome.	138	21	J12(RS3), D13(RS3), D14(RS3), J07, J11
5. Dermatome.	138	21	J16(RS3)
6. Myotome.	138	21	
CHAPTER 106: FACE, NOSE AND PALATE			
Short Essays	152	144	D05
1. Development of the face—description with labeled diagram and its anomalies.	152	144	
2. Facial clefts.	157	149	J05
③ Development of palate.	159	152	J17(RS3)
Short Answers	152	144	D08(RS2)
1. Development of face.	152	148	D10(RS2)
CHAPTER 107: ALIMENTARY SYSTEM I: MOUTH, PHARYNX AND RELATED STRUCTURES			
Short Essays	168	133	D07(RS2), D10(RS2), D00, J02, D04, D10, D14
1. Development of tongue and common congenital anomalies.	168	133	J11(RS2)
2. Tongue—lymphatic drainage and development.	168	133	
3. Tongue—development and nerve supply.	168	133	D16(RS3)
4. Hypobranchial eminence.	168	133	J12(RS3)

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Short Answer			
1. Development of tongue.			
CHAPTER 108: ALIMENTARY SYSTEM II: GASTROINTESTINAL TRACT			
Short Essays	168	133	J07(RS2), J16(RS3)
1. Name the parts derived from the foregut, midgut and hindgut.	174	171	D12
2. Developmental derivatives of midgut.	175	171	J11(RS2), J18(RS3)
3. Rotation of gut (midgut).	181	195	D08(RS2), J15(RS3), J14, D14
4. Development of rectum and anal canal.	180	191	J09(RS2)
5. Development of anal canal and anomalies.	180	191	J12
6. Discuss the congenital anomalies associated with umbilicus.	183	92	J14
Short Answers	—	—	D15
1. What is allantois and what is its fate after birth?	—	—	
2. Derivatives of foregut.	174	171	J16(RS3), D17(RS3), J04, D08, J14, J15, D16
3. Derivatives of midgut.	175	171	J08(RS2), D09(RS2), D11(RS3), D14(RS3), J99, J01, J02, J03, D04, D07, J08
4. Derivatives of hindgut.	175	171	J10(RS2), D16(RS2), J00, D00, D03
5. Ventral mesogastrium and its derivatives.	176	177	J06(RS2), J98, D99, J00, D01, J06, J11
6. Name the structures developing in the ventral and dorsal mesogastrium.	176	177	D13
7. Derivatives of the dorsal mesogastrium.	178	177	D02
8. Cecal bud.	179	189	D05
9. Development of cecum.	179	189	D02

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	IBSEMB	KDSN	
10. Development of vermiform appendix.	179	189	D11(RS3), D98
11. How does transverse colon develop?	180	190	J13
12. Development of rectum and anal canal.	180	191	J11(RS2)
13. What are the sources of development of anal canal?	180	191	J13, D15
14. Hirschsprung's disease or congenital megacolon.	183	193	J09
15. Imperforate anus.	183	195	D06
16. What are the complications of the persistent vitelline duct?	183	199	D13
17. Omphalocele.	184	198	J02
18. Situs inversus.	184	202	D06
CHAPTER 109: LIVER AND BILIARY APPARATUS; PANCREAS AND SPLEEN; RESPIRATORY SYSTEM; BODY CAVITIES, AND DIAPHRAGM			
Long Essay			
1. Describe the development of lung. Add a note on its congenital anomalies.	217	160	J14(RS3)
Short Essays			
1. Blood supply and development of pancreas.	197	186	D14
2. Development of pancreas and congenital anomalies.	197	186	J06(RS2), D07(RS2), J09(RS2), J17(RS3), D17(RS3), D18(RS3), J00, D07, D09, D11, D16
3. Development of spleen.	199	179	J07(RS2), D11(RS3)
4. Development and developmental anomalies of diaphragm.	211	166	D15
Short Answers			
1. Development of extrahepatic biliary system.	193	183	J17(RS3)
2. Development of gallbladder.	193	183	J02
3. Development of pancreas.	197	186	J16(RS3), D98, D00, D08, J13
4. Ventral pancreatic bud.	197	186	D05
5. Parts of pancreas developed from dorsal pancreatic bud.	199	186	J03

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	IBSEMB	KDSN	
6. Annular pancreas.	199	188	J07(RS2)
7. Development of spleen.	199	179	D17(RS2), D98, J10
8. Development of diaphragm.	211	166	J02
9. Maturation of lung.	219	160	J04
CHAPTER 110: CARDIOVASCULAR SYSTEM			
Short Essays			
1. <u>Interatrial septum</u> —development, congenital anomalies, applied anatomy.	233	207	J12(RS3), D16(RS3), J02, D04, J08, J09, J10
2. Development of right atrium.	235	208	J09(RS2)
3. Fallot's tetralogy.	243	220	D14
4. Ligamentum arteriosum.	245	223	D10(RS2), J01, J15
5. Arch of aorta—development, and mention one congenital anomaly of it.	245	224	J16(RS3), J06
6. Development of portal vein.	252	237	J05(RS2), J10(RS2)
Short Answers			
1. Septum spurium.	232	208	D14(RS3)
2. Development of <u>interatrial septum</u> .	233	207	J13(RS3)
3. Septum secundum.	234	207	J16(RS3)
4. Fossa ovalis in the fetus.	235	208	D15
5. <u>Spiral septum</u> .	236	210	D13(RS3), D17(RS3)
6. Mention development of interventricular septum.	237	213	J99
7. Fate of <u>sinus venosus</u> .	232	208	J15(RS3), D02
8. Probe patency test.	241	—	J04
9. Fallot's tetralogy (anatomical defect).	243	220	J09(RS2), D01, D03, D10
10. What is <u>ductus arteriosus</u> ? Give its fate.	245	223	J05(RS2), D07, D09, D15
11. What is <u>ligamentum arteriosum</u> ? Mention its embryological significance.	245	223	J98, D12
12. Development of <u>arch of aorta</u> .	245	224	D11(RS3), J10
13. <u>Ductus venosus</u> (functions and fate).	252	237	D03, J07
14. Left common cardinal vein (structures developed).	253	239	D09

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		IBSEMB	KDSN
15. Sub cardinal veins.	256	244	J02 J14(RS3)
16. Shunts in fetal circulation and their fate after birth.	260	249	
17. Name any two important changes in the fetal circulation soon after birth.	260	—	D02
■ CHAPTER 111: UROGENITAL SYSTEM			
Short Essays	265	191	D12(RS3), J17(RS3)
1. Cloaca.	265	256	D17(RS3), J99
2. Development of kidney and its anomalies.	265	258	D05(RS2), D99,
3. Mesonephric duct—development and derivatives.	266, 284	258	J05, J10, D13
4. Describe the ascent of the kidney and associated congenital anomalies.	268	260	D15
5. Development and anomalies of urinary bladder.	270	268	J05(RS2), D07(RS2), D16(RS3), D09
6. Paramesonephric duct and its fate in both sexes.	273, 275	274, 278	D08(RS2), J12(RS3), D16(RS3), J11, D11, J15
7. Development of uterus and its anomalies.	273	274	J14(RS3), J98
8. Development of external genital organs.	275	279	J13(RS3)
9. Testis—development, developmental anomalies and its descent.	278	283	D13(RS3), D15(RS3), J16(RS3)
Short Answers			
1. Streak gonads.	—	—	D06
2. Holonephros.	—	—	J12
3. Ectodermal cloaca.	—	—	J03
4. Prostatic utricle (development).	—	272	D06, J09
5. Gartner's duct.	—	295	D10
6. Cloaca.	265	191	J12(RS3)
7. Subdivisions of cloaca.	265	170	J08
8. Name the parts of the kidney derived from metanephric blastema and mesonephric duct.	265	259	J13
9. Ureteric bud.	265	266	J11
10. Name derivatives of ureteric bud.	265	256	J00
11. Name any four derivatives of endodermal cloaca.	265	191	D01

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	IBSEMB	KDSN
12. Metanephric blastema.	266	— J04
13. Mesonephric duct—formation and fate.	266, 286	258 J14(RS3)
14. Name any four development anomalies of kidneys.	269	261 J00, D02
15. Polycystic kidney.	269	264 D06, D07
16. Development of urinary bladder.	270	268 D10
17. Formation and fate of vesicourethral canal.	270	265 D14(RS3)
18. Development of trigone of bladder.	271	268 D05, J08
19. Urachus and its remnants.	271	268 J00
20. What is the fate of the allantois?	271	268 J14
21. Development of prostatic urethra.	271	270 D11
22. Hypospadias.	271	282 D09(RS2), D11(RS3), D07, J14
23. Describe the development of the prostate.	272	272 D02
24. Muellerian duct.	273	278 D05
25. Formation and fate of paramesonephric duct.	273	274, 278 D13(RS3)
26. Development of uterus.	273	274 D09(RS2)
27. Anomalies of development of uterus.	274	276 D13(RS3)
28. Imperforate hymen.	274	278 J09
29. Epispadias.	278	282 D06
30. Derivatives of primordial germ cells.	278	— J06
31. Processus vaginalis.	281	286 D15(RS3)
32. Anomalies of development of testis.	284	288 J14(RS3)
33. Derivatives of mesonephric duct (in males/females).	286	258 J10(RS2), D10(RS2), D18(RS3), J98, D01, D03, J07, J08, D08, J12
34. Derivatives of paramesonephric duct (in females).	286	274 D06(RS2), D98, D02, J02, J05, J10
35. Name the derivatives of gubernaculum of ovary in females.	286	— D08
■ CHAPTER 112: NERVOUS SYSTEM		
Short Essay		
1. Describe the neural tube formation and associated anomalies of the neural tube.	289, 307	65, 297 J15(RS3), J14

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IBSEMB

KDSN

Short Answer

1. Neural crest cells and its derivatives. 292 298 J09(RS2), D98, J99, D00, D05, D08

CHAPTER 113: ENDOCRINE GLANDS**Short Essays**

1. Histology and development of hypophysis cerebri. 314 338 J14(RS3)
 2. Development of suprarenal gland. 315 341 D14(RS3)
 3. Development and microscopic structure of suprarenal gland. 315 341 J08

Short Answers

1. How hypophysis cerebri is developed? 314 338 J10(RS2), J98
 2. Development of adrenal (suprarenal) gland. 315 341 J12(RS3), D11, D14

CHAPTER 114: DEVELOPMENT OF EYE

None

CHAPTER 115: DEVELOPMENT OF EAR**Short Answer**

1. Development of tympanic membrane. 332 321 J06

CHAPTER 116: CLINICAL APPLICATIONS OF EMBRYOLOGY**Short Essays**

1. Prenatal diagnosis—purpose and methods. 343 96 J09(RS2), D12
 2. Amniocentesis. 344 95 D14(RS3)

Short Answers

1. Name two teratogens. 343 — J06
 2. Prenatal diagnosis (different types, name two techniques). 343 96 J12(RS3), J01, D01, D04, D08, D09, J14

IBSHST

DFIOR

Section 9: HISTOLOGY**CHAPTER 117: LIGHT MICROSCOPY AND TISSUE PREPARATION**

None

CHAPTER 118: CELL STRUCTURE**Short Essay**

1. Sex chromatin. 18 — J07(RS2)

Contd...

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IBSHST

DFIOR

Short Answers

1. Mitochondria. 13 25 D09(RS2), J99, D00, D02
 2. Golgi apparatus/body. 14 30 J99, J02
 3. Centrioles. 17 17 J03, J11
 4. Barr body (sex chromatin). 18 — J05(RS2), J09(RS2), D10(RS2), J11(RS2), D12(RS3), J98, D99, J00, D02, D05, J06, J08, D11, D14, J15

CHAPTER 119: EPITHELIA**Short Essay**

1. Transitional epithelium (urothelium). 32 50 J04, D11

Short Answers

1. Simple squamous epithelium. 26 45 J11
 2. Draw a labeled diagram of transitional epithelium (urothelium). 32 50 J01, D04, D07
 3. Draw and label the microscopic structure of psudostratified columnar ciliated epithelium. 30 49 D11
 4. Stratified squamous epithelium. 30 51 D08(RS2)
 5. Draw a labeled diagram of the stratified squamous keratinized epithelium. 31 54 D13
 6. Name the three sites of stratified squamous nonkeratinized epithelium. 32 44 J08
 7. Transitional epithelium (urothelium). 32 50 J09(RS2), J10(RS2), D18(RS3), D98, J09
 8. Name the types of cells present in the transitional epithelium and mention their functions. 32 50 J13
 9. Basement membrane. 34 43 J99
 10. Microvilli. 35 22 J98, D14
 11. Brush border. 36 — J11

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IBSHST DFIOR

■ CHAPTER 120: GLANDS

Short Answers	38	62	J11
1. Mucus acinous.		56	J14(RS3)
2. Classify glands according to mode of secretion with one example each.	37		

■ CHAPTER 121: GENERAL CONNECTIVE TISSUE

None

■ CHAPTER 122: CARTILAGE

Short Essays	57	112	J15(RS3), D16(RS3), J02, D04, D12
1. Microscopic anatomy of the hyaline cartilage.			

2. Microscopic structure of elastic cartilage.	58	114	J12(RS3), J16(RS3), D08(RS2), D16
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Short Answers

1. Perichondrium.	54	110	J17(RS3), D98, D03
2. Examples of the hyaline cartilage in the body.	56	109	
3. Labeled diagram of hyaline cartilage.	57	113	J05(RS2), J06, J12
4. Articular cartilage—structure.	58	114	D07
5. Give any four features of hyaline cartilage.	56	109	D00
6. Neat labeled diagram of microstructure of elastic cartilage.	58	114	D13
7. Differences between hyaline and elastic cartilage.	57	109	D12
8. Histology of (white) fibrocartilage (draw and label).	59	116	J07, D11
9. Elastic cartilage (examples).	58	109	J99, J04

■ CHAPTER 123: BONE

Short Essays

1. Haversian system.	65	122	D09
2. Microscopic structure of transverse section of compact bone (labeled diagram, distinguishing features).	67	136	J18(RS3), J06, J13

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IBSHST DFIOR

Short Answers

1. Name three types of cells in the bone and their locations.	61	123	J01, D04
2. Draw a labeled diagram of haversian system.	66	136	D00
3. Draw a labeled diagram of the microscopic structure of compact bone.	67	136	J08(RS2), D13(RS3), J14(RS3), J02

■ CHAPTER 124: MUSCULAR TISSUE

Short Essays

1. Microscopic structure of skeletal muscle.	76	145	D15
2. Microscopic structure of cardiac muscle.	85	157	J11(RS2)

Short Answers

1. Sarcomere.	78	150	D16(RS3), D98
2. Draw and label microscopic structure of sarcomere.	79	150	J12
3. Any three differences between histology of skeletal and cardiac muscle.	87	145, 157	J08
4. Histology of cardiac muscle.	85	157	J12(RS3), J07
5. Intercalated disk.	85	157	D98

■ CHAPTER 125: LYMPHATICS AND LYMPHOID TISSUE

Short Essays

1. Microscopic structure of lymph node (labeled diagram, specific distinguishing features).	96	242	J05(RS2), J17(RS3), D18(RS3), J98, D99, D01, J05, D05, D06
2. Microscopic structure of palatine tonsil (neat labeled diagram).	104	256	D07(RS2), D08(RS2), J18(RS3), D09, D13

Short Answers

1. Role of colchicine in lymphocyte culture.	—	—	D10
2. Mention two histological differences between spleen and tonsil.	97, 104	254, 256	D05
3. Microscopic structure of lymph node (draw a neat labeled diagram).	96	242	J07(RS2), D11(RS3), J13(RS3), D14(RS3), J00, J08, D15

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		IBSHST	DFIOR
4. Microscopic structure of spleen (Draw and label).	98	254	D16(RS3), D04, D10
5. White pulp of spleen.	99	256	D08, D11
6. Red pulp.	99	256	J04
7. Hassel's corpuscles (location and embryological significance).	102	252	J98, J07, D10
8. Draw and label microscopic structure of palatine tonsil.	104	257	J10(RS2), J16(RS3)
9. Labeled diagram of the microscopic structure of thymus.	101	251	D17(RS3), D02, J12, J15
CHAPTER 126: NERVOUS SYSTEM			
Short Essays			
1. Microscopic anatomy of transverse section of peripheral nerve.	111	202	D12(RS3) 
2. Draw and label the microstructure of the sensory ganglion.	116	210	J14
3. Microscopic anatomy of sympathetic ganglion.	117	210	D10
4. Microscopic anatomy of cerebellum.	121	185	D15(RS3), D15
5. Describe the microscopic structure of cerebrum.	124	185	J14(RS3) 
Short Answers			
1. Nissl's substance.	106	180	J00, D00, D01
2. Three differences between structure of spinal ganglion and autonomic ganglion.	116	—	D07
3. Dorsal root ganglion.	115	210	D12
4. List four typical microscopic anatomical features of the dorsal root ganglion.	116	210	J07
5. Draw and label microscopic structure of spinal ganglion.	116	210	D07(RS2) 
6. Draw a labeled diagram of microscopic structure of cerebellar cortex.	121	185	J10
7. Name the layers of the cerebral cortex.	123	184	D10
CHAPTER 127: SKIN AND ITS APPENDAGES			
Short Essays			
1. Microscopic structure of thin skin (labeled diagram) difference from the thick skin.	127	266	J03

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		IBSHST	DFIOR
2. Draw and label microscopic structure of thick skin.	128	273	D11(RS3) 
Short Answer			
1. Myoepitheliocytes.	136	270	D10(RS2)
CHAPTER 128: THE CARDIOVASCULAR SYSTEM			
Short Essay			
1. Muscular artery—microscopic anatomy.	143	224	D06(RS2)
Short Answers			
1. Name the layers found in the wall of a vessel.	140	217	D10
2. Give three differences in the structure of elastic artery and muscular artery.	140	217	D08
3. Draw and label microscopic structure of elastic artery (large artery).	142	227	D08(RS2), J09(RS2), D18(RS3) 
4. Labeled diagram of histology of muscular artery (medium-sized artery).	143	225	D09(RS2), D03, J07, J12, D15
CHAPTER 129: THE RESPIRATORY SYSTEM			
Short Essays			
1. Describe the microscopic structure of trachea.	154	400	J14(RS3), D17(RS3)
2. Microscopic anatomy of lung.	156	402	D05(RS2), D13(RS3), D14(RS3) 
Short Answers			
1. Microscopic structure of trachea.	154	400	J06(RS2), J09
2. Microscopic appearance of lung (only labeled diagram).	156	402	J02
CHAPTER 130: DIGESTIVE SYSTEM: ORAL CAVITY AND RELATED STRUCTURES			
Short Essays			
1. Microscopic anatomy of tongue.	166	288	J13(RS3) 
2. Histology of parotid gland.	169	302	J10(RS2) 
3. Microscopic structure of submandibular salivary gland.	170	304	D11(RS3) 
Short Answers			
1. Circumvallate papillae.	165	288	J11

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	IBSHST	DFIOR	
2. Microscopic structure of tongue.	166	288	J12(RS3)
3. Microscopic appearance of lingual papillae (only labeled diagram).	167	289	D02
4. Draw and label taste bud.	167	291	J08(RS2)
5. Labeled diagram of microscopic structure of serous salivary glands (parotid gland).	169	303	D16(RS3), D01, D14
6. Draw and label microscopic structure of mixed salivary gland.	170	305	J12
CHAPTER 131: DIGESTIVE SYSTEM: ESOPHAGUS, STOMACH AND INTESTINES			
Short Essays			
1. Microscopic structure of jejunum.	184	348	J05
2. Microscopic structure of duodenum.	187	344	J07(RS2), D07(RS2), ✓ D13(RS3), D18(RS3), J98, J10, D10
3. Microscopic structure (histology) of ileum (Draw and label).	188	350	J08(RS2), D11, D16
4. Microscopic structure of the vermiform appendix.	191	360	J05(RS2), ✓ J10(RS2), J18(RS3), D13, D14
Short Answers			
1. Muscularis mucosa and its functions.	175	313	J00
2. Esophageal glands.	176	314	J03
3. Fundic glands of stomach.	178	330	J00, D02
4. Name the cells present in fundic part of stomach and give their secretion.	178	332	D07
5. Histology of fundic part of stomach.	180	324	D07(RS2), ✓ J12(RS3), D05
6. Diagram of histology of pyloric end of stomach.	181	335	D03
7. Plicae circulares.	—	341	D15(RS3)
8. Intestinal glands.	184	341	D15(RS3)
9. Crypts of Lieberkuhn.	184	341	D01
10. Goblet cell.	185	47	J15
11. Peyer's patches.	186	342	J00, J03, J11

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	IBSHST	DFIOR	
12. Duodenal glands of Brunner.	187	342	J02, J04
13. Give any three differences in the structure of duodenum and jejunum.	187	342	D08
14. Neat labeled diagram of microscopic structure of jejunum.	184	349	J01, D04, D06
15. Draw and label microscopic structure of duodenum.	187	345	D08(RS2), D09
16. Microscopic structure of ileum.	188	350	J11(RS2), D98, D03
17. Histological structure of vermiform appendix (only labeled diagram).	191	360	J09(RS2), J03, J07, J12
CHAPTER 132: HEPATOBILIARY SYSTEM AND PANCREAS			
Short Essays			
1. Microscopic structure of liver (draw and label).	194	370	D05(RS2), D08(RS2), ✓ D10(RS2), J15(RS3), D17(RS3), J08, J13, J15
2. Gallbladder—microscopic structure and applied anatomy.	199	384	D09
3. Microscopic structure of pancreas.	201	378	J08(RS2), J10(RS2), ✓ D16(RS3)

Short Answers

1. Differentiate hepatic lobule from portal lobule.	193	367	J99
2. Draw and label classical lobule of liver	195	373	D07
3. Portal lobule.	193	367	J12
4. Portal triad (constituents).	193	367	J11
5. Neat labeled diagram of histological structure of liver.	194	371	D11(RS3), D00, J03
6. Histology of gallbladder.	199	384	J09(RS2), D06, D10
7. Microscopic structure of pancreas (neat labeled diagram).	201	378	D14(RS3), D98, J04, J05, D05
8. Islets of Langerhans.	202	380	J15
9. Name the types of cells present in islet of Langerhans and what do they secrete?	202	380	J14

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IBSHST DFIOR

■ CHAPTER 133: THE URINARY SYSTEM

Short Essays

1. Microscopic structure of kidney (draw and label). 205 420 J05(RS2),
J12(RS3),
D12(RS3), ~~J05~~
D14(RS3),
J17(RS3), D15

2. Microscopic structure of ureter. 214 438 J09
215 443 J16(RS3), D12

Short Answers

1. Diagram of histology of kidney. 205 421 J04, J06
— J02, J14

2. Diagram showing parts of nephron 206 (name the parts). 417 D98, J11

3. Renal corpuscle (Malpighian corpuscle) 206 — J99

4. What are podocytes? Mention its 208 functions. 437 D06

5. Histology of medulla of kidney. 209 425 J98

6. Mention the lining epithelium of 209 loop of Henle. What is its functional significance? 211 426 D02

7. Juxtaglomerular apparatus. 214 438 D05(RS2),
J08(RS2) ~~J05~~
D10(RS2),
J11(RS2), D99,
J01, J03, D05,
J06, D08

8. Microstructure of ureter. 215 443 D08(RS2), D01,
D03

■ CHAPTER 134: MALE REPRODUCTIVE SYSTEM

Short Essays

1. Microscopic structure of testis (draw and 218 label). 480 D07(RS2), J13

2. Microscopic structure of epididymis. 225 486 J11

3. Microscopic structure of vas deferens. 226 488 D08(RS2)

Contd...

IBSHST DFIOR

4. Histology of the prostate with a neat 229 496 J14
labeled diagram.

Short Answers

1. Microscopic appearance of testis (only 218 labeled diagram). 480 D11(RS3),
J12(RS3),
D17(RS3), D02

2. Mention the functions of cells of Sertoli. 220 479 J02, D12

3. Interstitial cells of Leydig. 220 477 D03

4. Microscopic structure of epididymis 225 486 D09(RS2),
D18(RS3), D06
(draw and label).

5. Mention two histological features of 225 486 D99
epididymis.

6. Microscopic structure of vas deferens. 226 488 J06(RS2),
J08(RS2), D98

7. Corpora amyacea. 228 — D03

8. Microscopic structure of prostate gland 229 496 J14(RS3), D01,
(neat labeled diagram). J04, D05

■ CHAPTER 135: FEMALE REPRODUCTIVE SYSTEM

Short Essays

1. Microscopic structure of the placenta. A40 544 J09(RS2)

2. Microscopic structure of ovary. 233 508 J06(RS2),
D09(RS2),
D11(RS3),
J13(RS3),
J14(RS3),
D15(RS3), D99,
D12, D13

3. Microscopic anatomy of the uterine tube 238 520 D15
(Fallopian tube)—draw and label.

4. Microscopic structure of uterus (Draw 239 and label). 524 J07(RS2), D16

Short Answers

1. Microscopic structure of placenta A40 544 J03
(labeled diagram only).

2. Microscopic structure of ovary (Draw and 233 508 J18(RS3), D98
label).

3. Draw and label microscopic structure of 235 514 J10(RS2)
Graafian follicle.

4. Corpus luteum (draw and label). 236 516 J00

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		IBSHST	DFIOR
5. Microscopic structure of fallopian tube	238	520	J12(RS3), D15(RS3), 24 J17(RS3), D00, J02, D06, D07, J12
6. Draw a neat labeled diagram of microscopic anatomy of uterus.	239	524	D13(RS3)
7. Endometrium.	240	506	J17(RS3)
8. Microscopic appearance of endometrium in secretory phase (only labeled diagram).	240	526	D01

■ CHAPTER 136: ENDOCRINE SYSTEM

Short Essays

1. Microscopic structure of pituitary gland.	250	454	D09(RS2), D02
2. Histology and development of hypophysis cerebri.	250	454	J14(RS3)
3. Microscopic structure and development of thyroid gland.	255	464	D06
4. Microscopic structure (histology) of thyroid gland.	255	464	J07(RS2), J08(RS2), D10
5. Development and microscopic structure of suprarenal gland.	260	470	J08
6. Microscopic structure of the suprarenal gland.	260	470	D06(RS2), D11(RS3), 259 , D10

Short Answers

1. Microscopic appearance of hypophysis cerebri (only labeled diagram).	250	454	D01
2. What are the secretions from the basophilic cells of the pituitary gland?	252	458	J14
3. Draw a labeled diagram of histology of a thyroid follicle.	256	465	D05
4. Microscopic structure of suprarenal gland.	260	470	J02, D05

■ CHAPTER 137: SPECIAL SENSES: EYE

Short Essay

1. Describe the microscopic structure of cornea.	267	562	D16(RS3)
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IBSHST	DFIOR
1. Microscopic appearance of cornea (only labeled diagram).	267 562 D02

■ CHAPTER 138: SPECIAL SENSES: EAR

None

■ MISCELLANEOUS

Short Answer

1. Labeled diagram of the microscopic structure of umbilical cord.	—
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D07(RS2),
J10(RS2)

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PHYSIOLOGY

REFERENCES

1. GK Pal (GKPAL): Comprehensive Textbook of Medical Physiology—Two volumes (11th Edition), Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, ₹ 1395/-
2. AK Jain (AKJN): Textbook of Physiology—Two volumes (7th Edition), Avichal Publishing Company, Kala Amb (HP), ₹ 1450/-

COURSE CONTENTS**THEORY**

- I. General physiology
 1. Homeostasis, concepts of physiological norms, range and variations, active and passive transport, relationship between stimulus and response.
 2. Structure of cell membrane, resting membrane potentials, cellular receptors and intercellular communications.
 3. Body fluids—compartments, changes in body fluid compartments, hypo- and hyperosmolarity, replacement of body fluid loss.
- II. Body fluids—blood
 1. Blood composition, cellular elements of blood, their formation and regulation.
 2. Hemoglobin—synthesis and functions, jaundice, anemia and their classification.
 3. Hemostatic mechanisms, anticoagulants.
 4. Blood groups, Rh incompatibility, blood transfusion.
 5. Erythrocyte sedimentation rate.
 6. Basic mechanisms of immunity and functions of WBCs.
 7. Lymph—composition, circulation and functions.
- III. Nerve and muscle
 1. Classification of nerves, muscle.
 2. Structure of skeletal muscle, types of muscle fibers.
 3. Mechanism of contraction and its molecular basis, thermal and chemical changes during muscle contraction.
 4. Oxygen debt.
 5. Neuromuscular transmission, neuromuscular blocking drugs.
 6. Neuromuscular disorders, pathophysiology of myasthenia gravis.
 7. Smooth muscle—structure, mechanism of contraction and nerve supply and neurotransmitters.
- IV. Gastrointestinal tract
 1. Functional morphology.
 2. Functions, regulation of secretion of salivary glands, stomach, small intestine and large intestine.
 3. Regulation of gastrointestinal movements.
 4. Functions of gallbladder, liver.
 5. Site of production and action of gastrointestinal hormones.
 6. Mechanisms—intestinal absorption of food.
 7. Physiological basis of peptic ulcer, diarrhea and constipation, motility disorders—achalasia, Hirschsprung's disease.
- V. Kidney
 1. Functions of different parts of nephron in urine formation.
 2. Role of kidney in water and electrolyte balance, acidification of urine.
 3. Diuresis, kidney function tests.
 4. Juxtaglomerular apparatus and renin-angiotensin system.
 5. Renal blood flow.
 6. Structure and innervation of bladder, micturition, cystometrogram and disorders of micturition.
 7. Principles of artificial kidney.

VI. Skin and body temperature (environment)

1. Structure and functions of skin.
2. Regulation of body temperature.

VII. Endocrine glands

1. General principles of regulation of endocrine glands.
2. Hormones, functions, cellular mechanism of hormone action, regulation of secretion.
3. Experimental and clinical disorders of anterior and posterior pituitary, thyroid, parathyroid, adrenal cortex and medulla and endocrine pancreas.
4. Stress and hormones.
5. Physiology of growth.
6. Minor endocrine glands—pineal body, heart and kidney.

VIII. Reproduction

Sex determination and differentiation.

Male reproduction:

1. Functions of testis.
2. Constituents of semen.
3. Testicular hormones.
4. Spermatogenesis and regulation.

Female reproduction:

1. Menstrual cycle; changes in ovary; uterus, cervical mucus, vagina and hormonal regulation.
2. Ovulation and its detection.
3. Fertilization, implantation, physiological changes during pregnancy, fetoplacental unit, nutritional needs of mother during pregnancy, parturition, placenta, menopause.
4. Lactation, composition of breast milk.
5. Physiology of newborn.

Family planning and welfare:

1. Physiological basis of contraception in males and females.
2. Principles of use of oral contraceptives, safe period, rhythm and other methods of contraception.

IX. Cardiovascular system

1. Functional anatomy of heart.
2. Properties of cardiac muscle.
3. Principles of electrocardiography.
4. Electrical and mechanical changes in cardiac cycle.
5. Conducting system of heart.
6. Normal ECG.
7. Cardiac output and its measurement in man, physiological variations.
8. Regulatory mechanisms of heart rate and blood pressure.
9. Regional circulation: Normal values, physical principles governing flow of blood in heart and blood vessels, measurement and regulation of coronary, cerebral, skin.
10. Changes in CVS during muscular exercise, postural changes, hypovolemia, hypoxia and cardiopulmonary resuscitation.
11. Microcirculation, hemodynamics.
12. Pathophysiology of hypertension, shock, cardiac failure and coronary artery disease.

X. Respiratory system

1. Functional anatomy of respiratory system.
2. Mechanics of normal respiration.
3. Physical principles governing flow of air in respiratory passages.
4. Lung compliance, alveolar ventilation, ventilation-perfusion ratio.
5. Oxygen and carbon dioxide transport.
6. Diffusing capacity, pulmonary function tests.
7. Regulation of respiration.
8. Respiratory acidosis and alkalosis.
9. Pulmonary blood flow.
10. Hypoxia, cyanosis, asphyxia.
11. Respiratory adjustments during muscular exercise, hyperbaric conditions.
12. Principles of oxygen therapy, artificial respiration.
13. Hyaline membrane disease.
14. Pathophysiology of obstructive and restrictive disorders, pulmonary edema, decompression sickness, hyperbaric oxygen therapy, dyspnea.

XI. Central nervous system

1. Organization of the central nervous system.
2. Functions and neuronal organization at spinal cord level.
3. Synaptic transmission.
4. Motor and sensory systems and their lesions.
5. Reticular system in brainstem, sleep, wakefulness.
6. EEG waves and physiological changes in EEG.
7. Clinical lesions and experimental sections at spinal cord, brainstem and subcortical levels.
8. Physiology of basal ganglia, cerebellum, thalamus, hypothalamus, limbic system, prefrontal lobe and cerebral cortex.
9. Speech and its disorders.
10. Autonomic nervous system.
11. Formation and functions of CSF, blood-brain barrier.
12. Central neurotransmitters, neuroglia.
13. Physiological basis of CNS disorders like Alzheimer's disease, Parkinsonism, syringomyelia, tabes dorsalis.

XII. Special senses

Eye

1. Functional anatomy of eye.
2. Image formation on retina.
3. Structure of photoreceptors, electrical activity of photoreceptors.
4. Errors of refraction.
5. Functions of aqueous humor, intraocular tension.
6. Mechanisms of accommodation, dark adaptation, pupillary reflexes.
7. Functions of retina.
8. Optic pathway and lesions, role of visual cortex in perception.
9. Field of vision—color vision, acuity of vision and photochemistry of vision.
10. Nutritional deficiency—blindness.
11. Structure of photoreceptors, generator potentials of rods and cones.

Auditory apparatus

1. Functional anatomy of ear.
2. Physics of sound (basic).
3. Role of tympanic membrane, middle ear and cochlea in hearing.
4. Auditory receptors and pathway.
5. Deafness and its causes.
6. Principles of audiometry, tuning fork tests and its interpretation.

Vestibular apparatus

1. Structure and functions, connections and lesions of vestibulocochlear apparatus.

Taste and smell

1. Modality, receptors and pathway of taste and smell.
2. Cortical and limbic areas associated with taste and smell.

XIII. Biomedical waste

1. Types, potential risk and their safe management.

PRACTICAL**Procedure to be Performed by the Students****I. Hematology**

1. RBC count.
2. WBC count.
3. Differential leukocyte count.
4. Estimation of hemoglobin.
5. Blood grouping.
6. Bleeding time.
7. Clotting time.
8. Absolute eosinophil count.
9. Erythrocyte sedimentation rate.
10. Determination of blood indices—MCV, MCH, MCHC and color index.

II. Human physiology

1. Mosso's ergometry—at normal condition, after venous occlusion and arterial occlusion.
2. Recording of blood pressure, effect of posture and exercise on it.
3. Stethography—at rest, effect of deglutition, exercise, voluntary hyper-ventilation and break point after breath holding, breathing through long tube, rebreathing through bag.
4. Spirometry—lung volumes and capacities, MVV and dyspneic index, FEV1.
5. Peak expiratory flow rate (PEFR) by Wright's mini peak flow meter.
6. Cardiovascular fitness test—by Harvard's step test or bicycle ergometer or 2 km walk.
7. Visual field by perimetry.
8. Body composition—BMI (by Quetlet's Index) and body fat % by Durenberg's equation.
9. Recording of ECG in lead II.
10. Tests of autonomic functions.

III. Clinical examination

1. Examination of radial pulse.
2. Clinical examination of cardiovascular system.
3. Clinical examination of respiratory system.
4. Examination of cranial nerves.
5. Examination of sensory system.
6. Examination of motor system.
7. Examination of reflexes.

IV. Interpretation of charts, problems and case histories.**Demonstrations**

- I. Hematology
 1. Hematocrit.
 2. Reticulocyte count.
 3. Platelet count.
 4. Osmotic fragility.
- II. Nerve-muscle physiology
 1. Electromyography (EMG).
- III. Cardiovascular system
 1. Electrocardiography (ECG).
 2. Demonstration of sinus arrhythmias.
 3. Recording of arterial pulse tracing.
- IV. Respiratory system
 1. Determination of lung volumes and capacities and other lung function tests by computerized spirometry.
- V. Reproductive system
 1. Sperm motility and sperm count.
- VI. Special senses
 1. Audiometry.
 2. Purkinje-Sanson images.
 3. Ophthalmoscopy, retinoscopy.
 4. Examination of fundus.
- VII. Nervous system
 1. Autonomic function tests.
 2. Electroencephalogram (EEG).
- VIII. Amphibian practical
 1. Muscle—nerve and heart experiments if feasible for academic interest only (Graphs on amphibian experiments for university practical examination are deleted).

UNIVERSITY EXAMINATION PATTERNEligibility for Writing the University Examination

The candidate should have at least 35% aggregate in the two of the three internals conducted by the college and should also have minimum 75% attendance in Theory and Practical classes conducted.

Criteria for Passing the University Examination

- The candidate should secure minimum 50% in the university theory examination (University theory + Viva voce) and the university practical examinations separately.
- Candidate should also score 50% in Group A (University theory + Viva voce) and Group B (University Practical + Internal Assessment Theory and Practical).
- Class of passing would be determined from total of Group A + Group B. (Distinction—75% and above; First Class—65%–74.9%; Pass Class—50%–64.9%; Fail—<50%)

Distribution of Marks

	Internal assessment		University examination		Marks
	Maximum marks	Minimum marks to qualify	Maximum marks	Minimum marks to pass	
Theory examination	40 marks	14 marks	200 marks	120 marks	
Viva voce	—	—	40 marks	—	
Practical examination	40 marks	14 marks	80 marks	40 marks	

THEORY EXAMINATION

There shall be two papers each carrying 100 marks. The pattern of questions would be of three types.

2 Long Essay Questions	2 × 10 marks	20 marks
10 Short Essay Questions	10 × 5 marks	50 marks
10 Short Answer Questions	10 × 3 marks	30 marks
Total	100 marks	

Distribution of Chapters in Paper I and II for University Examination with Weightage of Marks

Paper I	Marks	Paper II	Marks
Topics		Topics	
General physiology	4	Endocrine	20
Blood	20	Special senses	20
Cardiovascular system	24	Reproduction	12
Respiratory system	20	Central nervous system	28
Gastrointestinal system	20	Muscle-nerve physiology	16
Renal system	12	Skin and body temperature	8
(Note: Marks for renal and gastrointestinal system can be interchanged.)		(Note: Marks for endocrine and reproduction can be interchanged.)	

(Topics assigned to the different papers are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics are inevitable and students are advised to be prepared to answer overlapping topics.)

PRACTICAL EXAMINATION

Practical examination consists of two sessions of 2 hours duration and 40 marks each.

Distribution of Practicals in Session I and II for University Examination with Marks

	Marks
I. Exercise I	
a. Clinical examination	20 marks
b. Procedures on human subjects	20 marks
II. Exercise II	
a. Hematology	
i. Major	20 marks
ii. Minor	10 marks
b. Interpretation of case histories/problems/charts	10 marks

Viva Voce

The viva voce examination shall carry 40 marks (portion of each paper carrying 20 marks) and all the examiners will conduct the viva examination separately for each candidate.

Question Bank

GKPAL AKJN

Section 1: GENERAL PHYSIOLOGY

CHAPTER 1: DEFINING THE ROLE OF PHYSIOLOGY IN MODERN MEDICINE

None

CHAPTER 2: FUNCTIONAL ORGANIZATION OF HUMAN BODY

None

CHAPTER 3: PRINCIPLES OF HOMEOSTASIS

Short Essays

1. Explain the role of 'positive feedback' regulation in endocrinology with one example. 10 5 D05(RS2), D13(RS3)

2. What are negative feedback loops? 11 5 D09(RS2), J13(RS3)

Short Answers

1. Define "homeostasis" and "hemostasis". 9, 196 4 D98

2. Homeostasis (define and give one example). 9 4 J13(RS3), D05

3. What is homeostasis? Describe positive feedback mechanism with suitable examples. 9 4 D07

4. Give examples for 'negative feedback' and 'positive feedback' mechanisms in the body. 10 5 D12

5. Explain the positive feedback mechanism of hormonal regulation with a suitable example. 10 5 D10(RS2), J02

6. Explain with the help of examples "negative feedback" mechanism of hormonal regulation. 11 5 J00

CHAPTER 4: CELLULAR ORGANIZATION AND INTERCELLULAR CONNECTIONS

Short Essay

1. Intercellular connections (cell junctions). 24 10 D09(RS2), D11(RS3), J17(RS3), D18(RS3)

Short Answers

1. Enumerate various structures present in a cell (cell organelles). Give their functions. 5 5 D07

Contd...—

Physiology

Contd...—

	GKPAL	AKJN	
2. Structure of cell with a neat diagram.	13	5	J00
3. List the functions of cell membrane.	16	7	J13
4. Outline the structure of mitochondria and its function.	16	9	D15
5. Write the functions of 'endoplasmic reticulum.	17	8	D13
6. Mention the functions of: (a) Mitochondria, (b) Golgi apparatus.	17, 18	9	D09
7. Suicidal bags of a cell.	18	9	D16(RS3), D02
8. Mention the functions of: (a) Ribosomes, (b) Lysosomes.	20, 19	9	D10
9. Intercellular communication.	24	22	D15(RS3), D16(RS3), D10

CHAPTER 5: PHYSIOLOGY OF GENETICS AND APOPTOSIS

Short Answer

1. What is apoptosis? 37 12 D07(RS2)

CHAPTER 6: TRANSPORT ACROSS THE CELL MEMBRANE

Short Essays

1. Compare and contrast active transport with facilitated diffusion. — — D14

2. Transport across the cell membrane. 40 14 J18(RS3), J99

3. Enumerate various transport mechanisms across cell membrane. Explain (primary) active transport with an example. 44, 50 14, 18 D07(RS2), J12(RS3)

4. Facilitated diffusion—define and factors affecting it. 46 15 D13(RS3), J16(RS3)

5. Na⁺-K⁺ pump. 50 18 J08(RS2)

6. Secondary active transport (define, factors affecting with examples). 53 20 D12(RS3), J14(RS3), J15(RS3)

7. Exocytosis and endocytosis. 54 21 J13(RS3)

8. Explain endocytosis. 54 21 D08

9. Describe the different steps of phagocytosis. 55 88 D01, D12

Short Answers

1. What is difference between diffusion and osmosis? Give an example for each. 14, 17 J02

Contd...—

Contd...		GKPAL	AKJN
2. Name 'voltage gated' channels and 'ligand gated' channels.	41	16	J05
3. Explain ligand gated channel with example.	42	16	D03
4. Compare and contrast active transport mechanism and passive transport mechanism.	44	—	D02, J03, J14
5. Simple diffusion.	44	14	D14(RS3)
6. Four factors affecting rate of (simple) diffusion across cell membrane.	45	15	D10, D13
7. Explain facilitated diffusion with an example. How does it differ from simple diffusion.	46	15	J05(RS2), D09(RS2), J11(RS2), J17(RS3), J04, J10, J13
8. What is active transport? Give examples.	50	18	J00
9. Define 'primary active transport'. Give an example of primary active transport in the cell membrane. What is its function?	50	18	D12, D15
10. What is the function of calcium ATPase pump?	52	20	D05
11. Secondary active transport.	53	20	J06(RS2), J11(RS2), D17(RS3)
12. Explain exocytosis and endocytosis with an example for each.	54	21	D09(RS2), J17(RS3), D01, D04, D09
13. Explain the mechanism of endocytosis with an example.	54	21	D10(RS2), J10
14. Describe steps of exocytosis.	55	21	J12
15. Phagocytosis (mechanism and stages).	55	88	J07(RS2), J98, J99, J11
CHAPTER 7: MEMBRANE POTENTIAL			
Short Essays			
1. In a tabular column compare 'local potential' and 'action potential'.	44	J05(RS2)	
2. Compound action potential. Give basis of its configuration.	149	D05(RS2), J04	

Contd... —

Contd...	GKPAL	AKJN	
3. Resting membrane potential and genesis (Ionic basis).	61	36	D06(RS2), J07(RS2), D10(RS2), D12

Short Answers

1. Explain what is compound action potential. —
2. Resting membrane potential and its ionic basis.

CHAPTER 8: BODY FLUIDS**Short Essays**

1. Body fluid compartments. 63 28 J09(RS2), D18(RS3)
2. What is extracellular fluid volume (ECF) and how is it measured? 63 29 D08
3. Classify the fluid compartments of body giving their normal values. Mention two methods to determine ECF. 64 28, 29 J01
4. Name two principles to determine volume of body fluid compartments. 64 29 J05
5. Briefly describe a method for determination of total body water. 65 — D05

Short Answers

1. What is the normal plasma osmolarity? —
2. Classify body fluid compartments. Give their normal values. 64 28 J15(RS3), J04
3. What is the normal ICF volume and ECF volume? Mention any one method for the determination of the same. 64 28 J02
4. What is the normal value of extracellular fluid volume? Name one substance used to measure it. 65 28 J07, J14
5. Two methods of determination of ECF. 65 29 D99
6. Explain one method of determination of plasma volume in man. 65 30 D02
7. Name the constituents of ECF and ICF. 66 28, 30 J13(RS3), D03

Contd... —

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GKPAL AKJN

Section 2: BLOOD AND IMMUNITY**CHAPTER 9: COMPOSITION AND FUNCTIONS OF BLOOD AND PLASMA PROTEINS****Long Essays**

1. Enumerate the plasma proteins along with their site of synthesis. List the important functions of plasma proteins and their normal serum levels. Define hypoproteinemia and discuss its clinical significances/add a note on albumin-globulin ratio.

2. Explain how plasma albumin determines fluid movement across capillaries. Name four other functions of plasma proteins.

74

54, 56

J08(RS2),
D09(RS2),
D10(RS2),
J17(RS3)**Short Essays**

1. How much is normal blood volume and how is it kept constant?

2. Describe one method for determining blood volume.

3. Plasma proteins—enumerate, functions.

74

54, 57

J04

74

54, 57

D14(RS3),
D15(RS3),
D18(RS3),
J98, D99,
D10, D16**Short Answers**

1. What is colloidal osmotic pressure and its significance?

2. What is plasmapheresis? What is its importance?

3. Give the value of normal blood volume in adults. Explain the principles of measurement of blood volume.

4. Functions of plasma proteins.

74

54

D11(RS3)

74

57

J16(RS3),
J06, D07,
D09

5. Name three important plasma proteins. Give one important function of each.

6. Name the plasma proteins. How much pressure exerted by these proteins in vascular system? What is the importance of this pressure?

74

54

D05(RS2)

74

54, 57

J08

Contd...

Contd...

GKPAL AKJN

7. Give the normal concentration and function of albumin.

74

54

D98, D13

CHAPTER 10: BONE MARROW AND HEMOPOIESIS

None

CHAPTER 11: RED BLOOD CELLS**Short Essays**

1. Explain the effect of shape of RBC on osmotic fragility. Name two conditions where osmotic fragility is increased.

2. Packed cell volume (PCV).

3. Erythrocyte sedimentation rate (ESR).

87

88

D05

D99

J12(RS3),
J98**Short Answers**

1. What is packed cell volume (hematocrit) and how is it determined? Give its significance.

2. Erythrocyte sedimentation rate (normal ESR, factors influencing it and its clinical importance).

88

88

D11(RS3),
J04

88

88

J07(RS2),
J01, J02, J06,
J12**CHAPTER 12: ERYTHROPOIESIS****Long Essay**

1. What is erythropoiesis? Name the sites of erythropoiesis in an adult. Describe the stages/process of erythropoiesis. Briefly describe the factors affecting erythropoiesis. How is this process regulated?

90

69

J06(RS2),
J14(RS3),
D18(RS3),
D98, J99,
D00, D02,
D13**Short Essays**

1. Compare the red blood cell (RBC) from patients with B_{12} and iron deficiency stages.

2. Describe the stages of erythropoiesis with their characteristic features. Mention the sites where erythropoiesis occurs.

3. List the changes in erythroid precursors during maturation. Explain the basis of macrocytic anemia.

90

70

D99, J07, J14

4. Describe the factors responsible for synthesis and maturation of red blood cells.

91

70

J04

4. Describe the factors responsible for synthesis and maturation of red blood cells.

93

70

D09

Contd...

Contd...	GKPAL	AKJN
5. List six erythropoietic factors. Specify the effects when any two are deficient.	93	70
6. Draw a flowchart to show the regulation of erythropoiesis. List four dietary substances needed for erythropoiesis.	94	70, J05(RS2)
7. Describe the effect of hypoxia and vitamin B ₁₂ deficiency on erythropoiesis and erythrocytes.	94	70, 74 D05
8. Explain why vitamin B ₁₂ deficiency causes anemia. Give the blood picture in this condition.	95	74 D06(RS2)

Short Answers

1. Enumerate the stages of erythropoiesis. Describe the fate of RBC.	91, 99	70 D07, D11
2. Describe a polychromatophilic normoblast and gives its significance.	92	70 D03
3. Four factors influencing erythropoiesis.	93	70 D99, D14
4. Erythropoietin (sources, action and regulation).	93	71 J07(RS2), J08(RS2), D03
5. Name the maturation factors in erythropoiesis.	93	72 D08
6. What are the effects of vitamin B ₁₂ and folic acid on erythropoiesis?	94	72 D10
7. Intrinsic factor of Castle—secretion and action (physiological significance).	96	72 D16(RS3), D08, D13
8. What is reticulocytes? What does reticulocytosis indicate?	97	— J02
9. Differentiate reticulocyte from erythrocyte.	97	70 D14

CHAPTER 13: DESTRUCTION OF RED BLOOD CELLS**Short Essay**

1. Describe the fate of hemoglobin of the damaged red blood corpuscle following hemolysis.	100	62 D15(RS3), J00, J03, J06
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CHAPTER 14: HEMOGLOBIN AND BLOOD INDICES**Short Essay**

1. Describe steps in hemoglobin synthesis. Add a note on disorders of hemoglobin synthesis. Mention two types of hemoglobinopathies.	104	62 J00
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Physiology

Contd...

Short Answers	GKPAL	AKJN
1. Types of hemoglobin	104	62 J18(RS3)
2. Fetal hemoglobin	104	63 J13(RS3)
3. What are the structural and functional differences between adult and fetal hemoglobin?	104	63 D00
4. Mention the functions of hemoglobin.	105	62 D08(RS2), D10(RS2)
5. Define and give the normal values for mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC).	107	— D00, J15
6. Calculate MCV and MCH, given; packed cell volume (PCV) = 45%, RBC count = 5 million/cumm, Hb% = 15 g%.	107	— D12(RS3)
7. Explain color index and its significance.	108	— D10
CHAPTER 15: PATHOPHYSIOLOGY OF ANEMIA AND POLYCYTHEMIA		
Long Essay		
1. What is anemia? Describe different types of anemia with their physiological causes.	109	72 J11
Short Essays		
1. Mention the causation, morphological features of red cells and treatment of pernicious anemia.	—	74 J11(RS2)
2. Macrocytic anemia.	110	75 J15(RS3)
3. Classify anemia based on blood indices. Explain any one type of anemia.	111	74 D12
Short Answers		
1. State the differences between beta thalassemia major and minor.	—	64 D09
2. B ₁₂ deficiency anemia—give two salient features.	—	74 D14
3. List two features and treatment of macrocytic anemia.	—	74 D16
4. Define anemia and give laboratory classification of anemia with an example for each.	109	72 J06(RS2), J12(RS3)
5. Iron deficiency anemia—important features, blood indices values.	111	76 D13(RS3), D15(RS3)

Contd...

Contd...

Contd...

	GKPAL	AKJN
6. What is meant by aplastic anemia? What is its clinical importance?	111	—
7. Sickle cell anemia.	112	—

CHAPTER 16: BLOOD GROUPS AND PHYSIOLOGICAL BASIS OF BLOOD TRANSFUSION

Long Essays

1. Explain the basis for classification of blood groups. Describe the Rh blood group system with its importance.	116, 120	110	J03
2. Classify blood groups and explain how erythroblastosis fetalis takes place.	121	109, 112	J08
3. Define jaundice. Enumerate the causes of jaundice. What is hemolytic disease of the newborn? Discuss in brief.	121	79	J10(RS2)

Short Essays

1. What is the basis of classification blood groups? Define and explain how Landsteiner's law is applicable to the blood group systems.	116, 119	109	D11(RS3)
2. Rhesus factor (Rh factor) and its significance. Add a note on erythroblastosis fetalis.	120	110	J06(RS2), D07(RS2), D14
3. What is erythroblastosis fetalis (Rh incompatibility in newborn)? Describe the manifestations. Give its basis and principle of treatment. How can it be prevented?	121	112	D12(RS3), J98, D98, D03, J10
4. What is meant by mismatched blood transfusion and explain the complications (consequences) of mismatched blood transfusion.	125	113	D06(RS2), D13(RS3), D17(RS3), J02, D02, D04, J15

Short Answers

1. Write briefly the importance of blood groups.	116	—	J08
2. What is Bombay blood group?	118	—	J12(RS2)
3. Name the agglutinogens and agglutinins present in blood in a person of O +ve group. What is "Bombay blood group"?	119, 118	109	J07(RS2)
4. State Landsteiner's law. Indicate to which blood group system it is not fully applicable.	119	110	D05(RS2), D09(RS2), J18(RS3), D01, D04, J11, J12, J14

Contd... —

Contd...

	GKPAL	AKJN
5. Give the agglutinogen and agglutinin content of different blood groups of ABO system.	119	109 J13
6. Name the agglutinogens and agglutinins in the following blood types: (a) AB negative, (b) O positive.	119	109 D03
7. Describe erythroblastosis fetalis (hemolytic disease of new born)— prevention and treatment.	121	J01, D02, J11
8. Kernicterus.	121	112 D16(RS3)
9. What is neonatal jaundice? What is the role of phototherapy in its treatment?	122	80 D09
10. Define exchange transfusion. Mention two indications.	122	— J05
11. Explain why people with 'O' blood group are called universal donors?	124	113 J10
12. Cross matching (define, types).	124	113 D15(RS3)
13. Complications (effects) of mismatched blood transfusion.	125	113 D99, D12
14. What is the mechanism of acute renal failure in mismatched blood transfusion reaction?	125	114 D16

CHAPTER 17: WHITE BLOOD CELLS

Long Essay

1. Classify the leukocytes and describe their morphological features with the help of diagrams. Elaborate the steps involved in the phagocytic function of neutrophils.	128, 136	84, 88	J11(RS2)
2. Classify leukocytes. Give an account of development (various stages of leukopoiesis) and functions of different leukocytes.	133, 128	84, 89	J18(RS3), J13

Short Essays

1. T cells versus B cells.	—	—	J08(RS2)
2. Write a short note on functions of leukocytes.	127	85	J14
3. Macrophages—functions.	144	117	D14

Short Answers

1. Classify lymphocytes based on function and specify their roles.	—	86	J05
		Contd... —	

Contd...	GKPAL	AKJN
2. List the functions of neutrophils.	136	85
3. Chemotaxis.	137	88
4. What is opsonization and its purpose? Name few opsonins.	137	88
5. Eosinophil.	139	85
6. Mention the functions of basophils.	142	86
7. Monocytes—morphology and functions.	143	87
8. How macrophages are derived and what are their function?	144	117
		D15

CHAPTER 18: THYMUS, LYMPHOID TISSUES, AND LYMPH

Short Essay

1. What is lymph? Describe the formation and circulation of lymph. What are its functions?	155	119	D11(RS3), J18(RS3), J10
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Short Answers

1. Explain why edema occurs with blockage of lymph vessels.	—	—	D03
2. Factors affecting flow of lymph.	—	120	D06
3. Functions of lymph.	156	120	D11
4. List the functions of lymphatic circulation.	156	120	J14(RS3)

CHAPTER 19: IMMUNITY

Long Essays

1. Classify T lymphocytes. Explain the mechanism of cellular immunity.	165, 170	124, 126	J16(RS3)
2. Describe in detail the mechanism of antigen recognition and activation of specific immune response in both humoral and cell-mediated immunity. How does HIV disease compromise immunity?	170, 180	125	D15

Short Essays

1. What is immunity? Describe specific and nonspecific immunity.	—	123	D06
2. Define 'innate immunity'. Mention the factors that contribute to the same.	159	123	D13(RS3)

Contd... —

Physiology

Contd...

	GKPAL	AKJN	
3. What is reticuloendothelial (monocyte-macrophage) system? Outline its function.	160	117	D14(RS3), D17(RS3), J02, J15
4. Macrophage system.	160	117	J13(RS3)
5. T lymphocyte—functions.	165	125	J09(RS2), D12(RS3), D16(RS3), D17(RS3), J07, D16
6. Cell-mediated immunity.	170	125	D05(RS2)
7. Explain the role of lymphocytes in immunity.	171	125	J00, J01, J06
8. Describe the mechanism of humoral immunity.	172	127	D07
9. Explain the role of 'B' lymphocytes in immunity.	173	125	D10
10. Describe the formation and functions of immunoglobulins.	176	128	D05

Short Answers

1. What is active and passive immunity? Give one example for each.	—	D00
2. What is immunity? Mention the two types of immunity.	158	123
3. Reticuloendothelial system.	160	117
4. List the cells and functions of reticuloendothelial system.	160	117
5. Explain acquired immunity.	164	125
6. T-lymphocyte—types, functions.	165	125
7. Give the functions of helper T cell.	165	127
8. List the functions of 'B' lymphocytes.	168	126
9. Plasma cells.	173	118
10. What are immunoglobulins? What are their functions.	175	128
11. Draw a diagram showing components of immunoglobulin G (IgG) molecule.	176	128
12. Autoimmune phenomenon.	179	—

Contd... —

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GKPAL

AKJN

CHAPTER 20: PLATELETS AND THEIR ROLE IN HEMOSTASIS**Long Essay**

1. What are platelets? Describe the process of blood coagulation. Name any two anticoagulants and describe their mode of action. 186, 200, 94, 98, 205, 103 D06

Short Essays

1. Platelets 186 94 J99
 2. Describe briefly the functions of thrombocytes. 189 96 D98, D01
 3. Explain the role of platelets in hemostasis. 190 96 D07(RS2)

Short Answers

1. What is megakaryocyte? Where it is present? Briefly write its function. 185 95 D08
 2. Describe the morphology of platelets. 186 94 J12
 3. Functions of platelets (thrombocytes). 189 96 D05(RS2), D09(RS2), D12(RS3), J14(RS3), J17(RS3)
 4. What is the normal platelet count? Give two functions of platelets. 190 95 D17(RS3)
 5. Explain the mechanism of platelet aggregation. 191 96 J10
 6. Name two tests to assess platelet function and give normal value of each. 194 — J04
 7. Purpura. 194 106 D18(RS3)
 8. Thrombocytopenic purpura. 194 106 J10(RS2), J13(RS3), J08
 9. Purpura and hemophilia. 194, 209 106, 105 D09(RS2)

CHAPTER 21: BLOOD COAGULATION**Long Essays**

1. Define hemostasis. Describe the stages of hemostasis. Describe the mechanism of blood coagulation. 183, 200 98 D09

Contd...

Contd...

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AKJN

2. Enumerate coagulation factors. Describe the intrinsic and extrinsic mechanism of coagulation with a neat flowchart. Add a note on anticoagulants/Add a note on hemophilia (commonly occurring bleeding disorders)/Add a note on tests for coagulation. 196, 200, 100, 98, J07(RS2), 205, 209 103, D08(RS2), 105 J12(RS3), J15(RS3), D16(RS3), J01, D04, D07

Short Essays

1. Name the procoagulants and explain how these hasten the coagulation process. — — J09
 2. Temporary hemostasis. 184 98 J14(RS3)
 3. Name the clotting factors and add a note on purpura. 196, 194 100, 106 D11
 4. Intrinsic mechanism of blood coagulation. 200 101 D10(RS2), D14(RS3), J18(RS3), J12, D13
 5. Draw a schematic diagram to show the steps in the intrinsic pathway of blood clotting. Name the mechanisms that initiate this pathway in vivo and in vitro. 200 101 D03
 6. Describe the extrinsic pathway of clotting. 201 101 J13
 7. Describe the process and significance of clot retraction. 202 100 J07
 8. Give a note on fibrinolytic system. 202 103 D10
 9. Describe the naturally occurring mechanisms which normally prevent clotting. 203 98 J05(RS2)
 10. Mechanism of fibrinolysis. 203 103 J16(RS3)
 11. Describe the factors maintaining fluidity of blood in the intact vascular system and the factors favoring tendency for clot formation. 205 102 D15
 12. Anticoagulants and their mode of action. 205 103 D05(RS2), D09(RS2), J99, D01, J15
 13. What is the normal bleeding time? Name one condition where it is prolonged. 208 — J14
 14. Give a brief account of hemophilia. 209 105 J00, D00, J02, J14

Short Answers

1. Vitamin K. — 105 D08(RS2)
 2. Why is blood clotting abnormal in patients with vitamin K deficiency? — 105 D07(RS2)

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	GKPAL	AKJN
3. What is the effect of vitamin K deficiency on coagulation?	—	105 D15
4. List two causes of increased bleeding time.	—	D14
5. List the natural mechanisms responsible for arrest of bleeding from small blood vessels.	183	98 J05
6. Coagulation factors.	196	100 J10(RS2)
7. Mention the role of factor VII and factor XIII in clotting mechanism. What is hemophilia?	198	100 D12
8. Draw a flowchart showing extrinsic mechanism of clot formation.	200	101 D16
9. Plasmin.	203	103 J98
10. Mention any four factors that prevent coagulation of blood inside the blood vessels.	203	102 J03
11. What are anticoagulants? Give examples.	205	103 D13
12. Name two anticoagulants with their mechanism of action.	205	103 D13(RS3), D14(RS3)
13. Heparin and two actions of heparin as anticoagulant.	206	103 J06
14. Explain how: (a) Dicoumarol and, (b) EDTA prevent blood clotting.	206	104 D02
15. Name two anticoagulants used in the laboratory and explain the mechanism of action of any one.	206	— J04
16. How does heparin act as an anti-coagulant?	207	103 D15
17. What is prothrombin time? Explain its usefulness as a hemostatic test.	208	— D06(RS2)
18. Name two bleeding disorders. What is von Willebrand's factor?	209	104 D07(RS2)
19. Classify hemophilia and its causes of each	209	105 J08
20. Describe classical hemophilia.	209	105 J99, D07, J10, J15

Section 3: NERVE AND MUSCLE

CHAPTER 22: STRUCTURE AND FUNCTIONS OF NEURONS

Short Essay

1. Myelinogenesis.

217 139 J10(RS2)

Contd...

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Short Answers

1. Give a note on myelinogenesis. 217 139 D10
2. Myelination and its physiological significance. 218 139 J05, J15

CHAPTER 23: NERVE POTENTIALS

Short Essays

1. Explain the response of a neuron to the application of a threshold stimulus. — J12

2. Define chronaxie, rheobase and utilization tissue. Draw a strength duration curve. 227 40 J02, J03, D04

3. Explain the strength duration curve. 227 41 D14

4. Action potential in the nerve—describe with a diagram, electrical changes and ionic basis of different phases, properties. 228 38 D08(RS2); D17(RS3); D02, J06, D06, D14

5. Draw a sketch of nerve action potential, label its components and explain their causation. 228 38 D15

6. Draw and label a nerve action potential. Explain propagation of action potential along an unmyelinated axon. 228, 233 39 J13, D16

7. Refractory period. 232 42 J10(RS2)

8. Describe the transmission of impulse in myelinated and nonmyelinated nerve fibers (propagation of nerve impulse). 233 146 D98, J09, D13

9. Describe the transmission of impulses in myelinated nerve fibers (saltatory conduction). 234 146 D14(RS3), D98

Short Answers

1. List four factors that influence conduction in nerve fibers. — J04

2. What is Quantal summation? Basis of quantal summation. — D15(RS3), J04

3. What are the characteristics of calelectro-tonus? — J05

4. List the properties of graded potential. 226 43 D16

5. Define the terms chronaxie, rheobase and utilization time. 227 41 D08(RS2), J17(RS3); J00, D00, J07, D07, J09, D15

6. Strength—duration curve. 227 41 J09(RS2), J08

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	GKPAL	AKJN
7. Draw a labeled diagram of monophasic nerve action potential in a neuron.	228	39 D99, D08
8. Explain the mechanism of action of local anesthetics.	231	— D06(RS2)
9. Explain the role of ionic calcium in nerve excitability.	231	145 J05(RS2)
10. Refractory period—define, cause, types and their role.	232	42 D03, D11
11. Define refractory period of an excitable tissue. Explain how it differs in cardiac and skeletal muscles, what is its significance.	232	42, 164 J03, J10
12. Absolute refractory period—ionic basis and significance.	232	42 J05(RS2), D12(RS3)
13. Describe saltatory conduction. What is its importance? What are its advantages?	234	146 J09(RS2), J18(RS3), D18(RS3), J98, J01, J02, J03, D14
14. Differentiate between local potential and action potential.	234	44 J03, D15

CHAPTER 24: PROPERTIES, CLASSIFICATION AND APPLIED ASPECTS OF NERVE FIBERS

Short Essays

1. Classify nerve fibers based on velocity and diameter (Gasser and Erlanger's classification). Mention the factors influencing conduction of velocity of nerve impulse.	237	148 J00, D01, D03, D09, J14
2. Explain changes during Wallerian degeneration and regeneration of injured nerve fibers.	238	152 D10(RS2), J11(RS2)

Short Answers

1. Write the two/three differences between — A and C type of nerve fiber.	236	149 J16(RS3), J15
2. Properties (electrical) and functions of nerve fibers.	236	145 J06, J07
3. Classify nerve fibers (Erlanger and Gasser classification).	237	148 J07(RS2), J06
4. Which are the large diameter myelinated nerve fibers according to Erlanger and Gasser's classification? Describe the mode of transmission of impulse in myelinated nerves.	237, 234	149 D11(RS3)

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	GKPAL	AKJN	
5. Distal changes in the axon following nerve injury (Wallerian degeneration).	238	152	D07(RS2), D15(RS3), D16(RS3), D99
6. What is 'chromatolysis'? When does it occur?	239	152	J13

CHAPTER 25: NEUROMUSCULAR TRANSMISSION

Long Essay

1. Define myoneural (neuromuscular) junction. Describe the structure of neuromuscular junction and the mechanism of transmission of impulse across neuromuscular junction of skeletal muscle with the help of a diagram. Write about the factors affecting transmission at myoneural junction.	241	157	J10(RS2), J11(RS2), J12(RS3), D16(RS3), J11
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Short Essays

1. Neuromuscular junction.	241	157	J18(RS3), J99
2. Outline the sequence of events during transmission of an impulse across the myoneural junction in skeletal muscle. Name one blocker of this junction and give its mechanism of action.	242	158	J05(RS2), J15(RS3), J16(RS3), D99, J02, J04, D04, D10
3. Neuromuscular blocking agents (classify and explain mechanism of actions).	244	159	D08(RS2), J17(RS3), D18(RS3), J98, J10
4. What is myasthenia gravis? What are its causes and clinical features? Explain the physiological basis of its treatment.	245	160	J06(RS2), D12(RS3), J00, D02, J05, J12

Short Answers

1. Mention neurotransmitter released and the disease that occurs at neuromuscular junction.	243	158, 160	J06(RS2)
2. Write steps showing fate of acetyl choline at neuromuscular junction.	243	158	J14(RS3)
3. Explain what is end-plate potential.	244	158	J09
4. Neuromuscular blocking agents—classify with one example each, clinical uses.	244	159	D03, D12
5. What is the mechanism of action of botulinum toxin?	244	159	D05

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	GKPAL	AKJN	
6. Explain the mechanism of action of curare.	160	D05(RS2)	
7. Name two anticholinesterase drugs acting at neuromuscular junction.	160	D15	
8. Describe the mechanism of action of a nondepolarizing neuromuscular blocker.	—	D05	
9. Myasthenia gravis (cause and the physiological basis of cure).	160	J98, J99, D01, D04, J08, D13, D14	
10. Briefly explain denervation super-/hyper sensitivity.	194	D14(RS3), D16(RS3), J05	

CHAPTER 26: STRUCTURE OF SKELETAL MUSCLE: PHYSIOLOGICAL ASPECTS

Short Essays

1. Draw diagrams to compare the sarcomere at rest and during contraction.	165	D05(RS2)
2. Describe the organization and function of sarcotubular system in the skeletal muscle.	166	D11(RS3), D14(RS3)
Short Answers		
1. Explain what is 'relaxing proteins' in skeletal muscle.	166	J12
2. Compare the role of troponin and calmodulin.	—	D06(RS2)
3. Muscle proteins and their functions.	166	D10(RS2), D00, J07
4. Name the contractile proteins present in the muscle.	166	J10
5. Troponin.	252	J99
6. Sarcomere (draw in relaxed and contracted state).	166	J06(RS2), J11(RS2), J15(RS3), J98, D00, J01, D01, J04, D04, J08, D11
7. Mention the components and functions of sarcotubular system in skeletal muscle (draw a labeled diagram).	166	J01, J13, D16
8. Write about storage, release, functions and reuptake of ionic calcium in skeletal muscle.	166	J16(RS3)

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CHAPTER 27: MECHANISM OF SKELETAL MUSCLE CONTRACTION

Long Essays

1. Describe the structure of a skeletal muscle. Explain the molecular basis of skeletal muscle contraction.
2. What is a sarcomere? Describe the molecular basis of muscular contraction (excitation contraction coupling) in skeletal muscle. Add a note on myasthenia gravis.
3. Describe the molecular basis of skeletal muscle contraction. Add a note on isometric contraction.
4. Describe the excitation-contraction coupling in skeletal muscle. What is the phenomenon of muscle fatigue?
5. Describe the molecular basis of muscular contraction in skeletal muscle. Add a note on features seen in fatigue of a muscle.

Short Essays

1. Electromyogram. — 45 D10(RS2)
2. Describe the sarcotubular system. Explain the excitation contraction coupling the skeletal muscle.
3. Explain the (sliding filament) mechanism of muscle contraction.
4. Explain excitation-contraction coupling reaction with help of a diagram.
5. Role of calcium in muscle contraction. 259 168 D08(RS2), J15(RS3)
6. Walk along mechanism for contraction of muscle (molecular basis of muscle contraction). 259 168 D07(RS2), J08(RS2), J01, J10, D16
7. Isotonic and isometric contraction in skeletal muscle—define, describe the differences giving examples for each.
8. Explain two different ways by which force of contraction of skeletal muscle is increased in the body.

Short Answers

1. Explain electromyography and its clinical importance.

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2. Electromyogram (EMG). —	45	D12(RS3), D17(RS3)
3. What are fibrillations and fasciculations? — How are these recorded?	—	D07
4. What is isometric and isotonic contraction? Differentiate isometric and isotonic muscle contraction with one example for each.	264 170	D00, J02, J03, D08, D11, D14
CHAPTER 28: SKELETAL MUSCLE: PROPERTIES, FIBER TYPES, AND APPLIED ASPECTS		
Short Essays		
1. Explain the refractory periods in skeletal muscle. —	42	D07
2. Explain <u>temporal</u> and <u>spatial</u> summation in muscle. —	—	J05(RS2)
3. Enumerate the properties of skeletal muscle. Explain the property of fatigue in detail and factors affecting it. 266, 270	—	D11
4. Explain the length tension relationship in skeletal muscle. 268	171	D06(RS2)
5. Fatigue—define, sites, causes and effects of muscle fatigue, factors affecting. What is contraction remainder or physiological contracture? Why does the cardiac muscle not become fatigued? 270	—	D11(RS3), J08
6. Differentiate between red and white muscles. 271	174	D11
7. What is motor unit and how it is formed? 272	173	J11
Short Answers		
1. Refractory period in skeletal muscle. —	42	D18(RS3)
2. What are the functions of ATP in skeletal muscle contraction? 270	175	D09, J14
3. List four differences between type I and type II muscle fibers. 271	174	D16
4. Explain the causes of heat rigor and rigor mortis. 271	176	D09, J14
5. What is rigor mortis? Explain the mechanism of rigor mortis. What is its medicolegal importance? 271	176	D98, J01, D02, D03, J10, J12

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6. Motor unit—define, significance (of such arrangement in skeletal muscle), recruitment. 272	173	J05(RS2), D11(RS3), D14(RS3), J17(RS3), D98, D00, J07, D14, J15
7. Explain how asynchronous discharge of motor units is helpful. 273	174	D16

CHAPTER 29: SMOOTH MUSCLE AND CARDIAC MUSCLE**Short Essays**

1. Describe the differences between the two types of smooth muscle. 276
2. Describe the mechanism of smooth muscle contraction (excitation-contraction coupling in visceral smooth muscle). 279
3. Name the properties of smooth muscle. 280 How do you explain the semi rhythmicity in smooth muscle?
4. Functional properties of smooth muscle. 280
5. In a tabular form, give the differences between skeletal, cardiac and smooth muscle. 283
6. Compare and contrast skeletal muscle with cardiac muscle (two functional differences). 283
7. Five differences between smooth muscle and cardiac muscle. 283

Short Answers

1. Name the two major types of smooth muscles. Give any two differences between them. 276
2. Enumerate the properties of (visceral) smooth muscle. 280
3. Functions of smooth muscle. 281
4. Differences between skeletal muscle and smooth muscle. 283

Section 4: AUTONOMIC NERVOUS SYSTEM**CHAPTER 30: FUNCTIONAL ORGANIZATION OF AUTONOMIC NERVOUS SYSTEM****Short Essay**

1. Cholinergic sympathetic fibers. 288

924 D10(RS2)

Contd... —

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GKPAL AKJN

CHAPTER 31: SYMPATHETIC SYSTEM**Short Essay**

1. Enumerate effects of sympathetic stimulation. 299 930 J14(RS3)

Short Answer

1. Compare the effects of sympathetic and parasympathetic stimulation on pupil. 299 930 J15

CHAPTER 32: PARASYMPATHETIC SYSTEM**Short Essay**

1. Describe the effects of parasympathetic stimulation on cardiac and smooth muscles. 304 930 J10

CHAPTER 33: CONTROL OF AUTONOMIC FUNCTIONS AND APPLIED ASPECTS

None

CHAPTER 34: AUTONOMIC FUNCTION TESTS

None

CHAPTER 35: HEART RATE VARIABILITY

None

Section 5: GASTROINTESTINAL SYSTEM**CHAPTER 36: FUNCTIONAL ORGANIZATION OF GASTROINTESTINAL SYSTEM AND PRINCIPLES OF GASTROINTESTINAL REGULATIONS****Short Essays**

1. Outline the role of mucus in different parts of gastrointestinal tract. — D03

2. Draw a cross section of the small intestine to show the various layers. State the role of enteric nervous system. 329 202 J05(RS2)

3. Name the components of the enteric nervous system and outline role of enteric nervous system in the gut. 331 202 J04

Short Answers

1. Enteric nervous system. 331 202 J15(RS3) ~~✓~~

2. Describe myenteric and Meissner's plexus of enteric nervous system. 331 202 D09

CHAPTER 37: GASTROINTESTINAL HORMONES**Long Essay**

1. Give an account of gastrointestinal hormones with reference to site of production, regulation of secretion and function. 335 276 D08(RS2) ~~✓~~

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GKPAL AKJN

Short Essays

1. How is Gastrin liberated? What are its functions? Name factors that increase and inhibit its secretion. 335 224 J15(RS3), ~~D03, J04~~

2. Name the gastrointestinal hormones. 337 276, 236 D10

Describe the functions of cholecystokinin. 336 236 D05(RS2), ~~D15(RS3)~~

3. Cholecystokinin—pancreozymin. 336 236 D05(RS2), ~~D15(RS3)~~

Short Answers

1. Explain 'trophic' action of a gastrointestinal hormone. — J05

2. Enumerate the different gastrointestinal hormones. List their functions. 276 D99, D00, ~~J03, D05, J06, D06~~

3. Gastrin (source, action, stimulants and inhibitors). 335 224 J07(RS2), ~~J16(RS3), J99, J05, D13~~

4. Secretin (source, action and stimulants). 337 236 D06(RS2), ~~D13(RS3), J98, D98, J13, D16~~

5. Explain the role of secretin in regulation of bile secretion. 337 245 J11

6. Cholecystokinin/CCK-PZ (source, action and stimulants). 336 236 J12(RS3), ~~J99, D14~~

CHAPTER 38: PRINCIPLES OF GASTROINTESTINAL SECRETION AND SECRETION OF SALIVA**Long Essay**

1. Describe the composition, functions and regulation of secretion of saliva. 345 208 J12

Short Essays

1. Explain the mechanism of salivary secretion and its regulation. 209 D13(RS3), ~~D14(RS3), D02, D04, D05, D14, D16~~

2. Draw a diagram to show the pathway for salivary secretion when food is placed in the mouth (reflex salivation). Name four other stimuli that cause salivary secretion. — J05(RS2), ~~D03~~

3. Saliva (composition and function and regulation). 345 208 D05(RS2), ~~D09(RS2), J17(RS3), D12, J14~~

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Contd...	GKPAL	AKJN	
4. Explain the conditioned and unconditioned reflexes which increase salivary juice secretion.	347	—	J08
Short Answers			
1. Saliva (components) functions.	345	209	J10(RS2), D15(RS3), D17(RS3), J18(RS3), D98, J01, J02, D06, J13
2. Describe regulation of salivary secretion.	346	210	D07
3. What is conditioned salivary secretion?	347	—	J15(RS3) <i>✓</i>
CHAPTER 39: GASTRIC SECRETION			
Long Essay			
1. Describe the composition and functions of gastric juice. Describe various phases and regulation of gastric secretion with suitable experimental evidences.	350	221	J01, D01, D04, D07, J10, J15
Short Essays			
1. What is achlorhydria? What complications does it lead to?	—	75	J08
2. Functions of stomach.	348	221	J07(RS2), D09(RS2), J17(RS3)
3. Functions of gastric juice secretion.	351	221	D17(RS3)
4. HCl acid secretion—mechanism with help of a diagram, regulation.	351	222	J12(RS3), D13(RS3), J14(RS3), J98, J99, J00, J03, D05, J11
5. Regulation of gastric secretion.	354	223	J06(RS2), J07, J13
6. Explain the gastric phase of gastric juice secretion (experimental evidence).	354	224	D06(RS2), J14, D16
7. Pavlov's pouch.	355	1039	D11
8. Pptic ulcer—etiology, pathophysiology and treatment (physiological basis, mechanism of action of drugs used).	358	228	D05 (RS2), D16 (RS3), D09, D10, J12
Short Answers			
1. Gastric mucosal barrier.	—	219	D06
2. Explain functions of gastric mucosa	—	219	D07
3. Name the different cell types of gastric mucosa. Mention the functions of each of them.	350	219	J02

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Contd...	GKPAL	AKJN	
4. Enumerate the functions of parietal cells.	350	219	D98
5. Composition and function of gastric juice.	350	221	D11
6. Explain how gastrin acts on gastric juice secretion.	352	224	D10
7. What is the effect of vagotomy on stomach?	354	—	D05
8. What is the effect of sympathetic stimulation on stomach?	354	—	D05, J07
9. Explain the role of vagal stimulation of gastric juice secretion.	354	223	J10
10. Explain sham feeding.	354	224	J01, J02
11. Gastric phase of gastric secretion.	354	224	J10(RS2)
12. What is 'peptic ulcer'? Mention two causes for it.	358	228	D15
13. Physiological basis of treatment of hyperacidity.	359	—	J10(RS2)
14. Describe how gastric acid secretion can be reduced to treat acid peptic ulcer.	359	—	J11(RS2)
15. List the effects of gastrectomy.	360	228	D12
16. What are the sequelae after partial gastrectomy?	360	—	J09(RS2)
CHAPTER 40: PANCREATIC SECRETION			
Long Essay			
1. Describe the composition, functions and regulation of secretion of pancreatic juice.	363	234	J00, D00
Short Essays			
1. Exocrine secretion of pancreas (pancreatic juice)—composition, mechanism, function (digestive), hormonal regulation of secretion.	363	234	J09(RS2), J12(RS3), D12(RS3), J13(RS3), J98, J02, D02, D04, D08, D09, J11, J12, D13, D14, D15
2. Proteolytic enzymes of pancreas.	364	235	J07(RS2), D11
Short Answers			
1. Exocrine functions of pancreas.	362	234	D10(RS2)

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	GKPAL	AKJN	
2. Pancreatic proteolytic enzymes—actions.	364	235	J99, D08, J14
3. Describe the actions of secretin and CCK-PZ on pancreatic secretion.	366	236	D09
4. Enumerate pancreatic function tests.	368	237	D06

CHAPTER 41: PHYSIOLOGY OF LIVER, LIVER FUNCTION TESTS, AND PATHOPHYSIOLOGY OF JAUNDICE

Long Essay

1. Differentiate between hemolytic and obstructive jaundice on the basis of relevant laboratory tests. Explain the differences in the results. 376 81 J05

Short Essays

1. Outline the formation, transport and excretion of bilirubin (bilirubin metabolism). 374 63, 79 J13(RS3) *✓*

2. What are the types of jaundice, their salient features and method of differentiation. 375 81 J11(RS2) *✓*, D16(RS3) *✓*

3. In a tabular column compare the urine tests used to differentiate pre- and post-hepatic jaundice. Explain the basis of their difference. 376 81 J05(RS2)

Short Answers

1. List the functions of liver. 372 242 J05(RS2), D98, D99, J01, J02, D02, D06

2. Enumerate liver function tests. 373 — J12

3. Bilirubin—source/mechanism of excretion. 374 63, 79 D06, D12

4. Jaundice (classify and one cause for each type). 374 80 J98, D08

5. Obstructive jaundice (blood changes). 375 81 J06, J13

6. Mention any two differences between obstructive and hemolytic jaundice giving the basis for the difference. 376 81 D98

7. State the differences between pre-hepatic and post-hepatic jaundice. 376 81 D13

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CHAPTER 42: BILIARY SECRETION

Short Essays

1. Bile—components, functions, regulation of secretion. Name the effects of bile duct obstruction. 378 241 J06(RS2), J07(RS2), D15(RS3), J18(RS3), D03, D07, J15 *✓*

2. Explain the enterohepatic circulation. Give its importance. 379 244 J12(RS3)

3. What are the functions of bile? Explain the enterohepatic circulation of bile salts and its importance. 382, 379 245 D07(RS2), D10(RS2), D02, D04, D14 *✓*

Short Answers

1. Composition of bile. 378 241 J15(RS3)

2. Compare hepatic and gallbladder bile. 379 246 J00, J05

3. Bile salts (name and functions). 379 243 J99, D99, J04, D08, D11, D15, D16

4. Enterohepatic circulation (of bile salts) and its functional importance. 379 244 D05(RS2), D13(RS3), J16(RS3), D00, D01, J02, J03, D04 *✓*

5. Describe the functions of gallbladder. 381 245 J13(RS3), D09, J11

6. List the effects of cholecystectomy. 382 246 J05(RS2)

7. List the function of bile. 382 245 J14(RS3), *✓* J00, D00, D01, D04, J07, D13, J14

8. Cholerectic and cholagogues. 382 245 D07(RS2), J10 *✓*

9. Which substances are called cholagogues and what is their importance? 382 245 D08

CHAPTER 43: INTESTINAL SECRETION

Short Essays

1. Succus entericus—composition and functions. 386 249 D99, D11

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	GKPAL	AKJN	
2. Name the enzymes of succus entericus and their actions.	386	249	D11(RS3)

Short Answers

1. Succus entericus.	386	249	J99
2. List enzymes produced by intestinal mucosa.	386	249	J04

CHAPTER 44: SECRETION OF LARGE INTESTINE**Short Essays**

1. Functions of large intestine.	—	—	D06(RS2), D14(RS3), D99, J15
2. Name the bacteria in intestine. In which segment of gastrointestinal tract it is located? How does it help man?	390, 387	—	J09

Short Answer

1. Explain the functions of colon (large intestine).	—	—	J16(RS3), J00, J01, D07, J12, J13
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CHAPTER 45: INTRODUCTION TO GASTROINTESTINAL MOTILITY**Long Essay**

1. Explain the types of movements in different parts of gastrointestinal tract.	395	214, 226, J13(RS3) 251, 256	
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Short Answers

1. What is migratory motor complex?	396	227	J09(RS2)
2. Explain the genesis of peristalsis in small intestine.	396	252	D06(RS2)
3. Describe the initiation, progress and purpose of peristalsis in small intestine.	396	252	D11(RS3), D16(RS3)

CHAPTER 46: CHEWING AND DEGLUTITION**Short Essays**

1. Deglutition reflex.	—	215	D06(RS2), J99
2. Define deglutition. Describe the stages and mechanism of deglutition with their regulation.	398	214	J06(RS2), D16(RS3), D18(RS3), D06, D07

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Physiology

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	GKPAL	AKJN	
3. Name the phases of deglutition. Explain the pharyngeal (second) phase of deglutition. Add a note on achalasia cardia.	399	214	J09(RS2), D09(RS2), J11(RS2), J14(RS3), D14(RS3), D15(RS3), J17(RS3), D98, D00, J03, D12, J13 D11(RS3)
4. Describe the esophageal phase of deglutition. What is achalasia cardia and its effect.	399	215	J06

Short Answers

1. Centers of deglutition.	—	215	J06
2. Deglutition (swallowing).	398	214	D08(RS2), J98, J07
3. Write briefly on pharyngeal phase of deglutition.	399	215	D08
4. Enumerate four changes occurring during second stage of deglutition.	399	215	D14

CHAPTER 47: ESOPHAGEAL MOTILITY**Short Essay**

1. Achalasia cardia.	402	216	J06
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Short Answers

1. Role of lower esophageal sphincter.	402	215	J05
2. What is achalasia cardia (gastric)? What is it due to?	402	216	J10(RS2), J12(RS3), J04, J08, D08, D13, J15

CHAPTER 48: GASTRIC MOTILITY**Short Essays**

1. Describe the movements of the stomach.	406	226	J06
2. What is gastric emptying time? Explain the factors which influence it.	408	226	J11(RS2), D99, J02, J05, J11, D13
3. Describe the causes and events in vomiting (emesis).	409	229	D11(RS3)

Short Answers

1. What are the movements of stomach?	406	226	D11
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	GKPAL	AKJN
2. Receptive relaxation—define, role in stomach.	226	J16(RS3), J04
3. What is the effect of composition of chyme on gastric motility?	227	D05
4. What is the effect of fatty meals on stomach?	227	J07

CHAPTER 49: SMALL INTESTINAL MOTILITY

Short Essays

1. <u>Describe the different types of movements of small intestine.</u>	413	251	D07(RS2), J16(RS3), D98, D01, J14, D16
2. Intestinal movements and slow wave.	413	251	J08(RS2)

Short Answers

1. What are pendular movements? In which condition does it take place?	413	251	D07
2. What is myenteric reflex? What is its importance?	413	252	D02
3. Types of intestinal motility.	413	251	D05(RS2)
4. Small intestinal movements.	413	251	J98, D11, J14
5. What is the importance of segmentation peristalsis in small intestine?	413	251	D08
6. Explain <u>enterogastric reflex</u> and its significance.	415	227	D11(RS3), D05, J10
7. What is paralytic ileus? What is its cause?	415	253	D09

CHAPTER 50: MOTILITY OF LARGE INTESTINE

Short Essays

1. Describe the type of movements of large intestine and their functions.	417	256	J03, J10, D15
2. <u>Mass peristalsis.</u>	417	256	J18(RS3), D08
3. Explain the mechanism of defecation in an adult (defecation reflex in large intestine).	418	258	D12(RS3), J05, J08

Short Answers

1. What is 'mass peristalsis'? What is its cause?	417	256	D13
2. What is gastrocolic reflex?	417	256	J07
3. Briefly describe the process of defecation (defecation reflex).	418	258	D10(RS2), D05

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	GKPAL	AKJN	
4. What is Hirschsprung disease?	419	257	J14(RS3)
5. What is megacolon and what are the causes and complications of this disease?	419	257	D07(RS2), J08, J09

CHAPTER 51: PRINCIPLES OF DIGESTION AND ABSORPTION

Long Essay

1. Describe in detail the digestion and absorption of fats. Add a note on steatorrhea.	423	266, 238	D17(RS3)
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Short Essays

1. Describe the digestion and absorption of carbohydrates.	421	263	D12(RS3)
2. Describe process of digestion and absorption of proteins in GIT.	422	268	D10
3. Explain the digestion and absorption of dietary fat.	423	266	D16(RS3), J18(RS3), D12, D15

Short Answers

1. Name two substances absorbed mainly in lower small intestine. Give the role of any one.	—	J04
2. <u>What are chylomicrons?</u> How and where chylomicrons are formed and their functions?	267	D17(RS3), D08, D15
3. Give the site of absorption of: (a) Vitamin B ₁₂ and (b) Iron in the gut.	271	J13
4. <u>What is 'steatorrhea'?</u> Mention any one cause for it. Give its physiological basis.	238	D12(RS3), D10, D12, J13
5. <u>What are micelles and how are they formed? What are its functions?</u>	266	J11(RS2), D14(RS2)
6. Name the enzymes that help in triglyceride digestion.	266	J05
7. Enumerate the enzymes causing protein digestion.	268	J12
8. Name the important proteolytic enzymes and their mode of activation.	268	J11(RS2)

Section 6: ENDOCRINE PHYSIOLOGY

CHAPTER 52: INTRODUCTION TO ENDOCRINOLOGY

Short Essay

1. Describe the neuroendocrine inter-relationships.	436	—	J06
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GKPAL AKJN

Short Answers

1. Define hormone. Explain characteristics 431 657 D09, J14
 of a hormone.
 2. With an example, explain paracrine 436 — D14
 signaling of hormone.

CHAPTER 53: MECHANISMS OF HORMONE ACTION**Long Essay**

1. With the help of suitable diagrams, 445 661 D07(RS2)
 describe the mechanisms of action of hormones through different system of second messengers.

Short Essays

1. Explain the sequence of events involved — 661 D11(RS3)
 in target cell response to hormonal action.
 2. Cellular mechanism of action of peptide — 661 D12(RS3)
 hormones.
 3. Explain the mechanism of action of 448 662 J12
 steroid hormones.

Short Answers

1. Explain the importance of knowing — — D13
 the chemical nature of a hormone to a clinician.
 2. Mechanism of actions of polypeptide — 661 D06
 hormones.
 3. Role of cyclic GMP as a second 448 24 D08(RS2)
 messenger.
 4. Explain the mechanism of action of 448 662 D01, D04,
 steroid hormone on their target cells. J08
 5. Calmodulin. 449 23 J98

CHAPTER 54: HYPOTHALAMUS AND HYPOTHALAMO-PITUITARY AXIS**Short Essay**

1. Hypothalamo-hypophyseal axis and its 456 668 J06(RS2),
 role in the regulation of anterior pituitary secretion. J01

Short Answer

1. Inhibitory hormones of hypothalamus and 456 1008 J07
 their functions.

Contd...

Contd...

GKPAL AKJN

CHAPTER 55: PITUITARY GLAND: THE ANTERIOR PITUITARY**Long Essay**

1. Name the cells in the anterior pituitary 460, 462, 668, 670, D08(RS2),
 gland and anterior pituitary hormones. 466 672 D11(RS3),
 Describe the mechanisms of action and D14(RS3),
 regulation of growth hormone. Describe D98, J00,
 the functions of growth hormone and J03, J05,
 also the effects of abnormal secretion of D07, D10
 growth hormone in children and adults (gigantism/acromegaly).

Short Essays

1. What are the effects of hypophysectomy? — 683 D09(RS2),
 J13(RS3)
 2. List four factors that inhibit growth 462 670 D06(RS2)
 hormone secretion. Name other hormones regulating growth.
 3. Functions of growth hormone. 464 670 J17(RS3)
 4. Disorders of growth hormone secretion. 466 672 D12(RS3)
 5. Acromegaly. — 466 673 J11(RS2),
 D16(RS3),
 J99, J07
 6. Describe the effects of hypersecretion of 467 672 J09
 growth hormone.
 7. Dwarfism. 467 — 674 D16(RS3)
 8. What are the physiological effects of 469 679 J05
 prolactin?
 9. Describe the actions of TSH. How its 470 692 D03
 secretion is regulated?
 10. List the gonadotropic hormones and their 473 782 D03
 sources. Give their role in females.
 11. Give the source, target organs and 473 782 D17(RS3)
 actions of 'follicle stimulating hormone'
 (TSH).

Short Answers

1. What are somatotrophins? What are their 466 670 J06(RS2),
 actions? D00
 2. Acromegaly (mechanism and clinical 466 673 J10(RS2),
 features with basis). D13(RS3),
 J01, D03,
 D08
 3. Gigantism 466 672 D18(RS3)

Contd...

Contd...	GKPAL	AKJN	
4. Dwarfism (pituitary dwarf).	467	674	D17(RS3), D14
5. Functions of prolactin.	469	679	D08(RS2)
6. What are the effects of prolactin on breast development?	469	679	D16
7. Schematic diagram showing regulation of thyroid hormones.	470	693	J08(RS2)
8. List the functions of TSH.	471	692	D16
9. Gonadotropins—define and name them, gonadotropins. Give the sources, target organs and actions.	473	782	D05(RS2), J04, J10, D13

CHAPTER 56: POSTERIOR PITUITARY

Long Essays

1. Describe the synthesis, transport, storage and functions of posterior pituitary hormones.	475	679	J11
2. Mention the hormones secreted by the posterior pituitary gland. Describe their actions and regulation. What is neuroendocrine reflex? Give one example.	475, 480	679	J07

Short Essays

1. Explain the regulation of secretion of anti-diuretic hormone (ADH).	476	680	D17(RS3)
2. What are functions of ADH? What is the mechanism of action? Explain its role and its regulation.	477	680	J15
3. Explain the basis of any two features of diabetes insipidus.	478	681	D05(RS2)
4. Function of oxytocin.	479	681	J17(RS3)
5. Describe the milk ejection reflex.	479	682	J10(RS2), J12(RS3), J00
6. Describe neuroendocrine reflexes with examples.	480	—	D15

Short Answers

1. Explain why polyuria occurs in diabetes insipidus.	—	681	D13(RS3), D02
2. Antidiuretic hormone (vasopressin) and its action.	475	679	J10(RS2), D10(RS2), J99, J01, D01, D04

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Contd...	GKPAL	AKJN	
3. Explain how antidiuretic hormone acts on collecting duct.	477	680	J09
4. Diabetes insipidus (basis, lesion, features).	478	681	D18(RS3), D07
5. Mention the likely mode of development of diabetes insipidus and its resultant signs and symptoms.	478	681	J11(RS2)
6. Oxytocin.	479	681	D09(RS2), J13(RS3), J18(RS3)
7. Describe milk ejection reflex with diagram.	479	682	J07(RS2), D15(RS3), J05
8. Describe neuroendocrine reflex.	480	—	D00
9. Role of oxytocin in female reproduction/ parturition.	480	682	J03, J06

CHAPTER 57: THYROID GLAND

Long Essays

1. Describe the steps in the biosynthesis, storage and release of thyroid hormones (thyroxine) and indicate the clinical application of this knowledge. Describe the regulation and functions of thyroid hormone. What is "Wolff Chaikoff" effect? Add a note on hypothyroidism/ myxedema/cretinism. Indicate two sites where antithyroid drugs act and specify the substance at each.	483, 487, 689, 692, 488, 494, 694, 698	D06(RS2), D10(RS2), D15(RS3), J16(RS3), D99, J02, D04, D08, J13
2. Describe the physiological effects of thyroid hormones (on general metabolism, cardiovascular system and central nervous system). Briefly explain the physiological basis of the features of hyperthyroidism.	489, 492, 694, 698	D05, D16

Short Essays

1. Describe the differences between — 'pituitary dwarf' and 'thyroid dwarf'.	675	D02
2. Compare cretinism and dwarfism.	—	675
3. Describe the biosynthesis and functions of thyroxin.	683	D18(RS3), J06
4. Steps in thyroid hormone synthesis and their clinical applications.	689	J15(RS3)

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Contd...	GKPAL	AKJN
Regulation/feedback control of thyroid hormone secretion.	487	693
6. Effects of thyroxine on body metabolism.	489	694
Cardiovascular and central nervous system (CNS) effects of thyroxine.	489	695
8. Explain the basis of three features of hyperthyroidism.	492	699
Hypothyroidism (effects of hyposecretion of thyroid hormone)—clinical features and their physiological basis.	494	698
10. Myxedema (causes and features).	494	698
11. What is cretinism? How can it be prevented?	495	698
12. Enumerate thyroid function tests.	495	700
Short Answers		
1. What are the differences between pituitary dwarfism and cretinism?	493	675
2. Explain the mechanism of action of thyroxine.	488	662
3. Mechanism of increased basal metabolic rate (BMR) in hyperthyroidism.	489	694
4. Explain the cause of tachycardia in hyperthyroidism.	490	695
5. List the features of Grave's disease.	493	699
6. Physiological basis of use of a drug in the treatment of thyrotoxicosis.	493	700
Myxedema (clinical features).	494	698
8. Explain the skin changes occurring in hypothyroidism.	494	698
Cretinism (clinical features).	495	698
10. Thyroid function tests (describe any two).	495	700

Contd... —

Contd...	GKPAL	AKJN
CHAPTER 58: ADRENAL GLAND: THE ADRENAL MEDULLA		
Short Essays		
1. Compare and contrast actions of epinephrine and norepinephrine.	—	D09(RS2), J13(RS3), J03
2. Compare the effects of epinephrine and norepinephrine on heart and blood vessels.	—	J05
3. Physiological basis of differences in cardiovascular effects of adrenaline and noradrenaline.	742	D08(RS2)
4. Describe the effect of any two hormones on stomach.	744	J07
5. Explain how the epinephrine secretion is regulated.	740	D13(RS3)
6. Enumerate the physiological actions of catecholamines.	741	D13

Short Answers

1. Name to adrenal medullary hormones. 499
2. Name the catecholamines and give two actions. 499
3. Explain 'flight or fight' reaction. 502
4. What is pheochromocytoma? Which hormones increase in the blood circulation in this condition? 504

CHAPTER 59: ADRENAL CORTEX**Long Essays**

1. Enumerate the hormones secreted by adrenal cortex. Describe the actions, regulation of secretion of glucocorticoids. Add a note on Cushing's syndrome.
2. What are steps in secretion of glucocorticoids? Write about the mechanism of action of glucocorticoids and about their functions. Add a note on Addison's disease.
3. Describe regulation and functions of cortisol.
4. What are mineralocorticoids? What is their mode of action? Describe the regulation and functions of aldosterone. Add a note on Conn's syndrome.

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	GKPAL	AKJN	
Short Essays			
1. Functions of cortisol.	514	726	J17(RS3)
2. Describe the actions of glucocorticoids/ cortisol during stress response.	514	728	J15(RS3), D05
3. Describe the effects of cortisol on inflammation and allergy.	517	728	D16
4. Cushing's syndrome (causes and clinical features and their basis).	520	729	J06(RS2), J09(RS2), D11(RS3), J12(RS3), J14(RS3), J16(RS3), D00, D02, D09, J13, J14
5. Explain the basis of two features that are seen in hyperfunctioning of the adrenal cortex.	520	729	D06(RS2)
6. Enumerate the actions of aldosterone (mineralocorticoids). How is its secretion regulated?	523	730	J05(RS2), J16(RS3), D99, J00, J02, D04, J05, D10
Short Answers			
1. Diagram to show regulation of secretions of aldosterone.	—	D03	
2. Name the zones of adrenal cortex and hormones secreted by them.	507	721	J03
3. Transcortin.	511	723	J98
4. Explain with an example "permissive action" of hormones.	515	727	J00, J01
5. Explain, why cortisol is not advised in patients with osteoporosis.	516	727	D07(RS2)
6. Describe the anti-inflammatory action of cortisol.	517	728	J12
7. Explain features of Cushing's syndrome. Addison disease (clinical features and their physiological basis).	520 522	729 734	J04, J10, J15 J07(RS2), D07(RS2), J17(RS3), J01, J06, J09
9. What is the cause of hyperpigmentation in Addison's disease?	522	734	D16
10. Androgenital syndrome (clinical features).	522	735	D02, D06

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	GKPAL	AKJN	
11. Give typical findings in the adrenogenital syndrome in a postpubertal woman.	522	735	D08
12. Mention the factors regulating secretion of aldosterone.	523	732	D01
13. Actions of aldosterone.	524	730	D16(RS3), J17(RS3), D06
14. Aldosterone escape.	524	732	D10(RS2), J11(RS2), J15(RS3), J98, J99, D14
15. Describe the effects of primary hyperaldosteronism.	524	733	D11

CHAPTER 60: ENDOCRINE PANCREAS

Long Essays

1. Describe the endocrine regulation of — blood glucose level. 611 J05(RS2)
2. Describe the physiological actions and regulation of secretion of insulin. 535, 531 753, 751 D13(RS3)
3. Describe the physiological actions of insulin on carbohydrate metabolism. List the features of diabetes mellitus. 535, 540 753, 755 D14

Short Essays

1. Hormonal regulation of blood glucose — level. 611 D98, J06
2. Regulation of insulin secretion. 531 751 D14(RS3)
3. Factors that increases and decreases the insulin secretion. 531 751 J08(RS2)
4. Describe the mechanism of action of insulin. 533 754 D11
5. Mechanism of insulin action at cellular level. 533 754 D09(RS2), J13(RS3)
6. Principal actions of insulin. 535 753 J11(RS2), J12(RS3), D15(RS3), D15
7. Explain the action of insulin on carbohydrate metabolism. 535 753 J15(RS3)
8. Name the hyperglycemic hormones. Explain the mechanism of actions of any one of them. 543 748 J01

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	GKPAL	AKJN	
9. Glucagon—sources, functions and regulation.	544	748	J08(RS2), D16(RS3), J98, D08, J09
Short Answers			
1. Differences between diabetes mellitus and diabetes insipidus.	—	—	J14(RS3), J13
2. Renal glycosuria.	—	—	J99
3. Mention four hyperglycemic hormones that increase blood glucose level causing anti-insulin effect.	612	—	D10(RS2), D10
4. Human insulin.	529	749	J09(RS2), J99
5. Explain the regulation of insulin secretion.	531	751	D13
6. Describe the mechanism of action of insulin.	533	754	D09, J14
7. Name hypoglycemic actions of insulin.	535	753	D03, D12
8. Effects of insulin on glucose transporters.	535	754	D07(RS2)
9. Diabetes mellitus.	538	755	D06
10. Explain why glycosuria occurs in diabetes mellitus.	541	—	J01
11. Explain why polyuria occurs in diabetes mellitus.	541	—	J03
12. Explain the basis of polyphagia in diabetes mellitus.	541	756	D09(RS2), J13(RS3)
13. List the features of hypoglycemia.	543	759	D12(RS3), D03
14. List the functions of glucagon.	544	748	J14(RS3), D00, J02, J15
15. Action of somatostatin.	545	277	D08
CHAPTER 61: CALCIUM AND PHOSPHATE METABOLISM AND PHYSIOLOGY OF BONE			
Long Essays			
1. What are the functions of calcium ions in the body? Describe the role of different hormones in plasma calcium regulation. Add a note on hypocalcemic tetany.	547, 550, 560	707, 712, 717	D12(RS3), D05(RS2), J12
2. What is the normal calcium level in blood? Name the hormones required for calcium homeostasis. Describe how hormones regulate serum calcium level (endocrine regulation of serum calcium)? What are the clinical features of tetany? List two effects of hypercalcemia.	550, 560	707, 712, 717	D05(RS2), J07(RS2), J18(RS3), D18(RS3), J99, D01, D09, J14

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Short Essay

1. What is the normal blood calcium level? 550
How it is maintained? 707, 712 D98

Short Answers

1. List the functions of calcium in the body. 547
707
2. Mention three hormones regulating blood calcium levels. State their mechanism of actions. 550
712 J15(RS3)
3. Explain the role of parathyroid hormone in calcium metabolism. 550
713 D08
4. What is the normal serum calcium level? 550
List the hormones regulating it. 707, 712 J11(RS2),
J07, J11

CHAPTER 62: PARATHYROID GLAND, CALCITONIN AND VITAMIN D**Short Essays**

1. Regulation of parathormone secretion. 557
714 J07
2. Action of parathormone. 558
713 J14(RS3)
3. Describe the actions of parathormone. 558, 563
713 D99, J04, J08
Name one antagonistic hormone.
Describe the role of vitamin D in calcium metabolism.
4. Primary hyperparathyroidism. 559
718 J08(RS2)
5. What is tetany? What are causes, features and dangers of tetany. Describe signs of latent tetany. 560
717 D07, J15
6. Hypocalcemic tetany. 560
717 J06(RS2)
7. What is the normal serum calcium level? 560
What are the features of tetany? 707, 717 D02
8. 1, 25-dihydroxy cholecalciferol. 562
712 J98
9. Give the source, target organ/s and actions of 'calcitriol'. 562
712 D13(RS3)
10. Physiological actions of vitamin D. 563
712 D14(RS3),
D14

Short Answers

1. What is latent tetany? Explain one clinical test to detect it. — J03
2. Four (functions) effects of parathormone. 558
713 D06, D10, D11
3. What are the features of hyperparathyroidism? 559
718 J12
4. What are the complications of hyperparathyroidism? 559
718 D07

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	GKPAL	AKJN
5. <u>Tetany (physiological basis, signs).</u>	560	717
		J09(RS2), J05, J09, D09, J14
6. List the features of hypocalcemic tetany.	560	717
7. Actions (on bone) and regulation of calcitonin secretions.	561	715
		D15(RS3) D03, J09, D16
8. Give the source, target organs and the actions of calcitriol.	562	712
9. Role of vitamin D in the prevention of osteoporosis.	564	712
		D13 D08(RS2)

CHAPTER 63: PINEAL GLAND

None.

CHAPTER 64: LOCAL HORMONES**Short Answers**

1. Prostaglandins.	572	769	J06
1. Atrial natriuretic factor.	573	565	J08(RS2)
3. What is the action of atrial natriuretic peptide (ANP) on the kidney?	573	565	J08

Section 7: REPRODUCTIVE SYSTEM**CHAPTER 65: SEX DIFFERENTIATION AND DEVELOPMENT, PUBERTY AND MENOPAUSE****Short Essays**

1. Explain how sexual differentiation occurs in fetal life. Add a note on pseudohermaphroditism.	578	775, 780	J13
2. Turner's syndrome.	582	779	J06(RS2)

Short Answers

1. Explain what is Klinefelter's syndrome.	582	778	D13(RS3), D10
2. What is Turner's syndrome and how it is differentiated from Klinefelter's syndrome?	582	779	D07

CHAPTER 66: PHYSIOLOGY OF PUBERTY AND MENOPAUSE**Short Essays**

1. Describe the physiological changes that occur at the time of puberty in boys (secondary sex characteristics in male).	585	783	D14(RS3), D05
2. Physiology of puberty in females.	585	781	D08(RS2)

Contd... —

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	GKPAL	AKJN
3. What is menopause? Give its basis and features.	586	808 J04

Short Answers

1. Puberty.	584	781	J07(RS2)
2. Puberty and menarche.	584, 586	781, 783	D18(RS3)
3. List six secondary sexual characteristics in males.	585	783	D06(RS2)
4. Define menarche, menopause and amenorrhea and give timing of menarche and menopause.	586, 620	783, 808, J05(RS2), 813 J00	

CHAPTER 67: MALE REPRODUCTIVE SYSTEM**Short Essays**

1. Explain the functions of different types of cells in testis. What is 'capacitation' of sperms?	590	790, 819	D12
2. Sertoli cell and its role.	590	790	J09(RS2), D11(RS3)
3. Describe the <u>blood-testis-barrier</u> .	591	790	D14
4. Describe the spermatogenesis and list the factors regulating it. Mention factors causing male infertility.	597	790	J10(RS2), D16(RS3), J18(RS3), D18(RS3), J98, D99, J00, J02, J03, D04, J05, D11, D13
5. Endocrine functions of testis.	599	795	D18(RS3)
6. Describe the source and actions of testosterone in fetal life and adult life (at puberty).	599	795	J11(RS2), D12(RS3), J14(RS3), D03, J08, D09, J14, J15, D16

Short Answers

1. Factors causing movements of sperms.	—	825	J07(RS2)
2. What is the importance of counter-current exchange of temperature in the blood vessels supplying the testes.	589	790	J11
3. Sertoli cells—location and functions.	590	790	J05(RS2), D17(RS3), D02, J11
4. <u>Blood testis barrier</u> and its importance.	591	790	D06, J11, J12

Contd... —

		GKPAL	AKJN
5. What are the functions of androgen binding protein?	592	778	D16
6. Write the role of epididymis, seminal vesicle and prostate in reproduction.	593	793	J15(RS3)
7. What is spermiogenesis and spermiation?	594	791	J11
8. Define and explain "capacitation" of sperms and give the normal sperm count.	596	819, 795	D11(RS3), J12(RS3), J05
9. Semen (composition).	597	795	J10(RS2), D12(RS3), D02, J10
10. List the factors regulating spermatogenesis.	597	791	D06(RS2), D17(RS3), J08, D12, D15
11. Changes after bilateral vasectomy.	599	—	J12(RS3), J04
12. Endocrine functions of testis.	599	795	J17(RS3), J06
13. Give the source and any three actions of testosterone in adult life.	599	795	J13
14. What are the functions of testosterone?	600	796	D07
15. Describe the role of testosterone in fetal life.	601	796	D05(RS2)
16. Functions of testicular androgens.	602	796	J07
17. Inhibin (functions).	602	797	D08(RS2), D09(RS2), D12(RS3), J13(RS3), D05
18. Cryptorchidism—its effects on testis and its correction.	603	797	J99, D05, D07, D15
CHAPTER 68: FEMALE REPRODUCTIVE SYSTEM: FUNCTIONAL ANATOMY, OOGENESIS AND FOLLICULAR DEVELOPMENT			
Long Essay			
1. What are the functions of ovary? How are the ovarian functions regulated?	606, 627	804	J09(RS2)
Short Essays			
1. Briefly describe the process of oogenesis.	607	804	J07
2. Describe briefly the formation and functions of corpus luteum.	610	809	D99, J04, J11

Contd... —

	GKPAL	AKJN
1. List the various stages in the development of ovarian follicle. Mention three tests of ovulation.	608	804 J05(RS2)
2. What is corpus luteum? How is corpus luteum formed? Mention its function.	610	809 D14(RS3), J18(RS3), J00, J02, D06, D08, D11, J13

CHAPTER 69: MENSTRUAL CYCLE AND OVULATION**Long Essays**

1. Describe with neat diagram, the ovarian and endometrial changes during menstrual cycle. Explain their hormonal regulation.
2. Illustrate the ovarian, endometrial and hormonal changes in menstrual cycle. What is amenorrhea and when does it occur physiologically?
3. Describe the ovarian changes during normal menstrual cycle. Explain their normal basis. Mention the tests for detecting ovulation. What is its importance? Explain the mechanism of fertilization.
4. Describe the endometrial changes during a normal menstrual cycle. Explain the role of different hormone in each phase. Add a note tests for ovulation.
5. Explain the interplay between ovarian and hypothalamic—pituitary hormones for regulation of menstrual cycle.
6. Discuss in brief the hormonal control of menstrual cycle. What is menopause?

Short Essays

1. Describe the ovarian changes during a menstrual cycle.
2. Follicular phase of menstrual cycle.
3. Describe the endometrial/uterine changes during menstrual cycle.

Contd... —

Contd...	GKPAL	AKJN
4. Discuss the endometrial changes and hormonal control of 'proliferative phase' of menstrual cycle.	615	810 D13
5. Describe the endometrial changes occurring in the secretory phase of the menstrual cycle. What is the hormonal basis for these changes?	617	810 D01
6. Describe ovulation and its regulation. What are test (indicators) of ovulation.	618	808 J07(RS2), D05, , D09, J14
7. Describe the hormonal regulation of menstrual cycle.	618	812 D10
8. Describe the role of FSH and LH in regulation of ovarian cycle.	618	812 D08
9. Hormonal basis of endometrial changes during menstrual cycle.	618	812 D10(RS2)
10. Explain the indicators/different tests for ovulation.	619	809 D16(RS3), J18(RS3), X D12
11. Name four tests to detect ovulation. Explain the basis of any two tests. Calculate the likely day of ovulation in a 32 day menstrual cycle.	619	809 D03
12. What is amenorrhea? When does physiological amenorrhea takes place in the woman?	620	813 J11
Short Answers		
1. Explain how 'endometrial biopsy' is used to assess fertility.	—	809 D05(RS2)
2. Ovulation.	618	808 J10(RS2), D98
3. What is ovulation and which hormone is essential for ovulation?	618	808 J11
4. List hormones regulating menstrual cycle.	618	812 J08, D11
5. Explain LH surge (cause and effect).	618	812 J16(RS3), J15
6. Tests for/indicators of ovulation.	619	809 D07(RS2), D17(RS3), J00
7. Physiological amenorrhea.	—	J98
8. Explain the physiological basis of lactational amenorrhea.	620	— D14
9. Anovulatory cycles.	621	812 D16(RS3)

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Contd...	GKPAL	AKJN
CHAPTER 70: OVARIAN HORMONES AND CONTROL OF OVARIAN FUNCTIONS		
Short Essays		
1. Explain the actions/functions of estrogen.	624	806 D11(RS3), J12(RS3), J08
2. Hypothalamo-pituitary-gonadal axis in females.	627	— D07(RS2)
Short Answers		
1. List (four/three) functions of estrogen on female genital tract/mammary gland.	624	806, 845 D06(RS2), D12, D14
2. Actions of progesterone on fallopian tube, myometrium and mammary glands.	626	807, 845 J14(RS3)
CHAPTER 71: PHYSIOLOGY OF COPULATION		
Short Answer		
1. Explain the mechanism of ejaculation of semen.	632	818 J09
CHAPTER 72: PREGNANCY AND PARTURITION		
Short Essays		
1. Pregnancy tests (immunological tests).	—	829 J09(RS2), D16(RS3), D18(RS3)
2. Fetoplacental unit.	639	828 D10(RS2), J99
3. Describe the (hormonal) functions of the placenta.	641	826 J16(RS3), D01
4. Human chorionic gonadotropin.	641	826 J10(RS2)
5. Discuss the physiological changes during pregnancy.	642	830 D08
6. Cardiorespiratory changes in mother during third trimester.	643	830 J07(RS2)
7. Describe the maternal changes in cardiovascular system during pregnancy.	643	830 D14
8. Explain the mechanism of parturition.	646	831 J12
Short Answers		
1. Explain the physiological basis of any one test to investigate the cause of infertility in a male.	—	D13(RS3)

Contd... —

Contd...	GKPAL	AKJN	
2. Tests for pregnancy (name two with physiological basis) (immunological tests).	829	J16(RS3), D98, J06, J07	
3. <u>Fetoplacental unit</u>	639	828	D09(RS2), J13(RS3)
4. <u>Infertility in female</u> .	640	—	D09(RS2), J13(RS3)
5. <u>Placental hormones</u> .	641	826	J09(RS2), J17(RS2), J00, J09
6. Human chorionic gonadotropin (source, functions and clinical significance)	826	—	J14(RS3), J98, J10, D12
7. What are the structures that produce human chorionic gonadotropin (hCG) and mention the functions of hCG.	826	—	D07
8. Draw a graph to show the hCG level throughout pregnancy.	827	—	J05(RS2)
9. What are the functions of human chorionic somatotropin?	827	—	D16

CHAPTER 73: PHYSIOLOGY OF BREAST DEVELOPMENT AND LACTATION

Long Essay

1. Describe the role of different hormones in growth and development of breast. What is the role of prolactin and oxytocin in lactation.

Short Essays

1. Explain the importance of breastfeeding in prolactin secretion.

2. Describe the hormonal control of breast development and lactation.

Short Answers

1. Explain the effect of individual sex steroids on mammary gland development.

2. Hormonal control of lactation (enlist and specify their role).

CHAPTER 74: PHYSIOLOGY OF CONTRACEPTION

Short Essays

1. Describe the role of hypothalamus as a target for anti fertility agents.

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Contd...	GKPAL	AKJN	
2. Discuss the neuroendocrinological basis for the use of oral contraceptives.	823	—	D06
3. Explain the methods of contraception in male.	821	—	D00, J02, D04
4. Intrauterine contraceptive devices.	653	822	D14(RS3)
5. Explain the mechanism of action of oral contraceptive pills to prevent pregnancy.	654	823	J03, J10
6. Explain the permanent methods of family planning.	656	821, 822	J11

Short Answers

1. On a line diagram, indicate the 'safe period' in a 30-day menstrual cycle and give the significance of this knowledge.

2. List the methods of contraception in female.

3. Intrauterine contraceptive devices (IUCD) and their mechanism of action.

4. Explain the mechanism by which oral contraceptives prevent pregnancy.

5. Endocrine basis of use of oral contraceptives in female.

6. Safe method of family planning.

7. Permanent method of contraception.

Section 8: RENAL SYSTEM

CHAPTER 75: GENERAL INTRODUCTION AND FUNCTIONAL ANATOMY OF KIDNEY

Short Essays

1. Functions of kidney.

2. Endocrine functions of kidney.

3. What is the length and diameter of proximal tubule of nephron? What are the substances reabsorbed in this tubule?

4. Draw a diagram to show the structure of the renal filtration membrane. Explain the significance of each layer.

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Contd...

	GKPAL	AKJN
5. Juxtaglomerular apparatus (formation, diagram, hormones secreted and functions).	666	510
		J09(RS2), D10(RS2), J11(RS2), D13(RS3), J01, J03, J06, J09, J10, D11, J14, J15
6. Explain rennin-angiotensin mechanism.	667	512
7. What is renin? What is the stimulus for its production? How it will help in regulation of blood pressure?	667	511
		J02
Short Answers		
1. Functions of proximal convoluted tubules.	—	509
2. Name the synthetic functions of kidney.	—	513
3. List the functions of kidney.	659	512
4. Mention the non-excretory/extrarenal functions of kidney.	659	512
5. How is the structure of proximal tubule of kidney related to its function?	661	509
6. Draw a neat labeled diagram of a nephron.	661	509
7. Loop of Henle and its function.	661	510
8. Explain functions of collecting ducts of nephron.	662	510
9. Juxamedullary nephron.	663	510
10. Draw a neat labeled diagram of the glomerular filtering membrane.	664	508
11. What is the physiologic role of mesangial cells?	665	511
12. Juxtaglomerular apparatus and its functions.	666	510
13. What is the important function of macula densa in distal tubule of nephron?	666	511
14. Renin.	667	511
15. Angiotensin II.	668	512
		J09
		J98
		J99

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CHAPTER 76: RENAL BLOOD FLOW**Short Essays**

1. Describe the peculiarities (special features) of renal circulation. Explain the significance of one.
2. Describe the hemodynamics of blood flow through the kidneys.
3. Regulation of renal blood flow.
4. Autoregulation of renal blood flow.

Short Answers

1. List four special features (peculiarities) of renal circulation.
2. What is the cause of medullary hyperosmolarity in kidney?
3. What is the functional significance of rich blood flow through renal cortex?
4. What is the functional significance of slow blood flow through the renal medulla?
5. Explain the role of 'vasa recta' in renal function.
6. Why is renal medulla very susceptible to hypoxic damage?
7. Define autoregulation of renal blood flow? What is its importance?

CHAPTER 77: GLOMERULAR FILTRATION**Short Answers**

1. Describe the dynamics of glomerular filtration.
2. Calculation of net filtration pressure at glomerulus.
3. Give the formula to determine effective filtration pressure in glomerular capillaries and state the normal values. Explain the significance of any one.
4. Filtration coefficient.
5. How much is the hydrostatic pressure in the glomerulus of malpighian body and what is its importance?

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Contd...	GKPAL	AKJN
6. Glomerular filtration rate (define, normal value, factors influencing, measurement).	678	522
		J07(RS2), D08(RS2), D09(RS2), J12(RS3), D12(RS3), D13(RS3), J15(RS3), D15(RS3), J16(RS3), J17(RS3), J01, D01, D02, J03, D04, D09
7. Filtration fraction—define and calculation.	679	524
8. Role of angiotensin II in glomerular filtration rate.	680	523
9. Explain the tubuloglomerular feedback mechanism and explain the role of tubuloglomerular feedback in auto-regulation of GFR (glomerular filtration rate).	681	516
		J11
CHAPTER 78: TUBULAR FUNCTIONS		
Long Essay		
1. Describe the mechanism of formation of urine.	682	521
		D06(RS2)
Short Answers		
1. Name the steps in formation of urine. Explain their significance.	682	521
2. Define renal threshold. What is its value for glucose?	685	526
3. What are the substances reabsorbed in the proximal convoluted tubule.	685	527
4. Describe the renal tubular handling of sodium.	685	530
5. Sodium reabsorption by renal tubules (PCT).	685	530
6. Describe the reabsorption of water along renal tubules.	686	535

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Contd...	GKPAL	AKJN	
7. Describe the reabsorption of glucose in the renal tubules with a labeled diagram. Define 'TmG' and 'renal threshold'. Give the normal value for renal threshold and transport maximum for glucose. Name one substance which inhibits reabsorption.	687	527	J11(RS2), D98, J00, D02, D03, D04, J07, D07, D13, J15
8. Glucose reabsorption curve in renal tubules.	687	527	D18(RS3)
9. What is meant by renal threshold for glucose and transport maximum of glucose (T_m for glucose)?	688	527	J98, D01, D04, D12
10. Briefly describe the reabsorption of sodium in distal convoluted tubule.	691	530	D05
11. Name four hormones acting on renal tubules (influence urine formation).	695	564	D99
12. What is role of ADH in urine formation?	696	564	D14
CHAPTER 79: MECHANISMS OF URINE CONCENTRATION AND DILUTION			
Long Essays			
1. Describe the renal mechanisms of maintenance of normal specific gravity of urine.	699	550	J06(RS2)
2. Discuss the mechanism of formation of concentrated urine. Add a note on diuresis.	700, 707	550, 553	D07(RS2), J18(RS3)
3. Describe the counter-current multiplier system. What is its role?	701	550	D12(RS3)
Short Essays			
1. Describe the role of the kidney in water balance.	700	563	J13
2. Describe in detail how urine is concentrated in the kidney.	700	550	D14(RS3)
3. Counter current multiplier system in kidney.	701	550	D17(RS3)
4. Counter-current mechanism and its importance.	701	550	J15(RS3), J98, D06, J09
5. Role of kidney tubule in counter-current mechanism.	702	550	J14(RS3)
Short Answers			
1. Briefly describe the counter-current mechanism.	701	550	D05

Contd... —

Contd...	GKPAL	AKJN
2. Which are called counter current multipliers in the nephron and what are their importance? 701	550	J08
3. Role of loop of Henle in urine concentration mechanism. 701	550	J08(RS2)
4. What happens to the tubular fluid in thick ascending segment? 702	551	J07
5. What happens to the tubular fluid in the collecting duct? 702	551	D05
6. The role of ascending limb in urine formation. 702	551	D16
7. Give the role of counter-current exchangers in the kidneys. 703	551	J05
8. What is the role of vasa recta in counter-current mechanism? 703	551	J16(RS3)

CHAPTER 80: WATER EXCRETION, DIURESIS AND DIURETICS

Long Essay

1. Illustrate the mechanism of water reabsorption in different segments of nephron. 707	535	D11(RS3)
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Short Essays

1. Compare water reabsorption in proximal and distal nephron. 707	—	D12
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Short Answers

1. Outline the differences in the reabsorption of water in PCT from that of DCT. 705	—	D13(RS3)
2. What is meant by facultative absorption of water and obligatory absorption of water? Where does it take place? 705	536	D01, D04, J06
3. What is facultative reabsorption of water (in distal convoluted tubule) and the effect of its defect? 705	536	D15, D16
4. Explain how water is reabsorbed in collecting duct 707	536	D10
5. Osmotic diuresis. 707	554	D05(RS2), D98, J14
6. Diuretics 707	554	D16(RS3)

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CHAPTER 81: ACIDIFICATION OF URINE

Short Essays

1. Acidification of urine. 711	558	D09(RS2), J17(RS3)
2. Describe the buffer systems of the kidney. 712	558	D09
3. Role of renal tubular buffers. 712	559	J13(RS3)

Short Answers

1. Explain the mechanism of absorption of bicarbonate in the renal tubules. 710	532	D02, D07
2. Explain how bicarbonate ions are generated in the renal tubules. 710	533	J05(RS2)
3. How does renal tubule secrete ammonia? 710 What is its role in acidification of urine? 710	559	J01
4. What are the substances synthesized and excreted in the collecting duct of nephron helping in increasing acidity of urine? 710	558	J08
5. Name the buffers of renal tubules. 712	559	D17(RS3)

CHAPTER 82: KIDNEY FUNCTION TESTS AND PATHOPHYSIOLOGY OF RENAL FAILURE

Short Essays

1. Renal dialysis. —	546	J10(RS2)
2. What is artificial kidney? Explain the physiological basis of artificial kidney. Give any two indications. 718	546	D06, D11
3. Describe/enumerate renal function tests. 715, 673 How is renal blood flow measured? 718	574, 544	J06, D07
4. Define renal plasma clearance of a substance. Give the formula for clearance and explain its utility in the study of renal functions. 718	541	D15

Short Answers

1. Nephrotic syndrome. —	—	D08(RS2), J00, J02, J04, J09, J10
2. Artificial kidney—describe, principle, function, importance. —	546	J09, J10
3. Inulin clearance test. —	542	J15(RS3), J09
4. What is the normal value of inulin clearance? What is its significance? —	542	D14(RS3), J14
5. What is creatinine clearance test? What is its significance? —	542	D13

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Contd...	GKPAL	AKJN
6. Explain why creatinine clearance is used to estimate glomerular filtration rate.	542	J05(RS2)
7. What is PAH clearance test? What is its significance?	543	D09
8. Explain urea clearance test.	545	D07
9. How is a substance handled by the kidney if its clearance rate is 160 mL per minute?	718	J13
10. Define plasma clearance in kidney.	718	541
11. Define renal clearance. Give the normal value for PAH and inulin clearance. What do they indicate?	718	541 D18(RS3), D00, J02, D02, J07

CHAPTER 83: PHYSIOLOGY OF MICTURITION AND BLADDER DYSFUNCTIONS

Long Essay

1. Describe the nerve supply of the urinary bladder and the mechanism of micturition. What is cystometrogram? 722, 724 579 D99, J02, D10

Short Essays

1. Describe innervation of the urinary bladder with help of a diagram. Explain the process of micturition. 722, 724 579 D03, J09

2. Draw a labeled diagram of innervation to urinary bladder. Explain how micturition is affected in spinal shock. 723, 726 580 J05

3. Explain Laplace law. What is cystometrogram? 724 581 D08

4. What is cystometrogram (pressure volume relationship in urinary bladder)? Draw a labeled diagram. 724 581 D05(RS2), D07(RS2), D17(RS3) X

5. Mechanism and regulation of micturition. 724 581 J16(RS3)

6. Describe micturition reflex. Write a note on automatic/tonic bladder. 724 581 J12

7. Describe the spinal reflex arc for micturition, with a labeled diagram and explain two disorders of micturition. 724 582 D98

8. Automatic bladder. — 583 J10(RS2)

Short Answers

1. What is volume obligatoire? — 537 D07(RS2), J11

Contd... —

Contd...	GKPAL	AKJN
2. Explain how the structure of the urinary bladder is suited to its function.	579	J05(RS2)
3. Parasympathetic innervation of urinary bladder.	580	J15(RS3)
4. Draw diagram to show nerve supply to urinary bladder and its sphincters.	580	D06(RS2), J09(RS2), D07 X
5. What changes take place as the urinary bladder gets filled with urine? Give reasons for the changes.	581	D12
6. What is "cystometrogram"? Name the physical law.	581	D09(RS2), J10(RS2), J13(RS3), J17(RS3) X
7. Draw a labeled diagram of pressure volume curve of urinary bladder or cystometrogram (pressure changes within urinary bladder as it is gradually filled).	581	J07(RS2), D01, J03, D04, D05, J07
8. Draw a diagram to show the pathway for micturition reflex.	582	D13(RS3) X
9. Spastic neurogenic bladder.	726	584
10. Atonic bladder.	—	—

Section 9: CARDIOVASCULAR SYSTEM

CHAPTER 84: FUNCTIONAL ORGANIZATION OF CARDIOVASCULAR SYSTEM

Long Essay

1. Describe the role of the different types of blood vessels. Explain how it is related to their structure. 732 314 J04

Short Essay

1. Name the different types of blood vessels and give an example for each. Explain the role of any one type. 732 314 J05

Short Answers

1. Types of blood vessels and their significance. 732 314 D14

2. What is Windkessel effect? What is its importance/functions? 732 315 J12(RS3), J14(RS3), D16(RS3), D00, D07 X

Contd... —

Contd...

	GKPAL	AKJN
3. What are: (a) Resistance vessels, (b) Capacitance vessels, (c) Exchange vessels?	733	315 J01
4. Which segments of vascular system contribute the resistance to blood flow and why? Give the formula relating resistance to pressure and flow.	733, 804	315, 318 D11(RS3)
5. Capacitance vessels.	733	316 J08(RS2), D05(RS2), D15(RS3)
6. Differences between pulmonary and systemic circulation.	734	—

CHAPTER 85: FUNCTIONAL ANATOMY OF HEART, CARDIAC MUSCLE, CONDUCTING SYSTEM AND CARDIAC INNERVATION

Long Essay

1. Draw a labeled diagram of the conducting system of heart. Describe the conducting system of heart and its importance. Explain the pathway of spread of cardiac impulse. What is AV nodal delay? What is its importance?

Short Essays

1. Discuss the length-tension relationship in cardiac muscle. 740
 2. Define Sterling's law of the heart and explain its importance with the help of a graph. 741
 3. Conducting system of heart and mention velocity of conduction. 742
 4. Draw a diagram and explain the location and role of each part of the conducting system of the human heart. 742
 5. Draw a diagram of special conducting system of heart. How is idioventricular rhythm produced? 742
 6. Name the internodal tracts in the conducting system of heart. Explain the importance of AV nodal delay. 742, 757
 7. Compare the velocity of conduction in various parts of conducting system of heart. Give the significance of the slowest and fastest parts. 743
 8. Innervations of the heart. 743

328 D08(RS2)

Contd...

Physiology

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Short Answers

1. Intercalated disc and its significance. 739 179 D14(RS3), J15
 2. Define Sterling's law of muscle contraction. Explain its molecular basis. How it is applied in case of cardiac muscle. 741 185 D00, J01, D02
 3. Define Frank-Starling's law of heart. 741 185 D05(RS2), D17(RS3), J05
 4. Draw and label the pathway of impulse conduction in heart. 742 183 J11
 5. Name the special conducting (junctional) tissues of the heart. 742 282 D99
 6. Explain what is vagal tone? What determines it? Mention its importance. 744 328 J07(RS2), J09(RS2), J99, D06, D12, D16
 7. What are the effects of parasympathetic (vagal) stimulation on heart? 744 328 J11(RS2), D13(RS3)

CHAPTER 86: PROPERTIES OF CARDIAC MUSCLE

Long Essay

1. Describe the properties of cardiac muscle. 746 180 D16(RS3), D15

Short Essays

1. Properties of cardiac muscle. 746 180 J18(RS3), D18(RS3), D99
 2. List the properties of cardiac muscle. Explain its refractory period. 746 180 J14
 3. Enumerate the properties of cardiac muscle. Explain importance of the long refractory period. 746 180 D07

Short Answers

1. Mention properties of cardiac muscle. 746 180 J12(RS3)
 2. Name the properties of cardiac muscle and what is the importance of absolute refractory period. 746 180 J09
 3. What is physiological basis of auto-rhythmicity? 746 180 D17(RS3)
 4. SA node as pacemaker. 747 283 D06

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	GKPAL	AKJN
5. Refractory period of a cardiac muscle fiber and its significance.	186	J09(RS2), D18(RS3), J15
6. Why the cardiac muscles will not undergo tetanus or fatigue?	186	J03
7. Explain "all or none law" with respect to cardiac muscle and skeletal muscles.	186	D16(RS3), D01, D02, D04, D09, J10, J14
8. Define: (a) All or none law and (b) Starling's law.	186	D99
9. Define 'all or none law' and 'absolute refractory period'.	41	D12
10. What is the mechanism of staircase phenomenon?	187	D05
CHAPTER 87: ELECTROPHYSIOLOGY OF THE HEART		
Short Essays		
1. Cardiac action potential (ventricular muscle action potential).	180	D10(RS2)
2. Draw and describe cardiac pacemaker potential and explain the ionic basis.	180	J12(RS3), D13(RS3), J14(RS3), J07
3. Describe the generation of impulse in sinuatrial node.	182	J11
4. Draw a labeled diagram to show the membrane potential of cardiac pacemaker tissue. Explain the effect of vagal stimulation on this potential.	181, 328	J04
5. Generation and conduction (mode of propagation) of cardiac impulse over the heart.	182	D05(RS2), J01, J03, D10, D14, D15
Short Answers		
1. Draw and label the ventricular muscle action potential.	180	D02
2. Pacemaker potential (draw and label).	181	J13(RS3), D11
3. What is the effect of sympathetic stimulation on pacemaker potential?	182	J16(RS3)
4. Significance of AV nodal delay.	757	J05

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CHAPTER 88: ELECTROCARDIOGRAM**Long Essays**

1. What is ECG? Enumerate the various ECG leads with a suitable diagram. Discuss the various waves, intervals and segments in a normal ECG and their importance.

2. Name the lead systems employed in recording electrocardiogram. Describe a normal ECG/draw and label a typical electrocardiogram and explain the causation of various deflections and intervals.

3. What is Einthoven's triangle? Describe the electrocardiogram in lead II. Add a note on his bundle electrocardiogram.

4. Draw and describe a normal lead II electrocardiogram.

5. Explain the principle, method of recording, waves and intervals of electrocardiogram.

6. Give an account of the principles and methods used to obtain an ECG (electrocardiograph) record in man. Discuss how an ECG recording helps to evaluate conduction disorders of the heart.

Short Essays

1. Explain Einthoven's law. — — D13
2. Cardiac arrest. — — J10(RS2)
3. Standard limb leads. 760 299 D08(RS2)
4. Diagrammatically represent a normal ECG. Explain normal waves and causes for different waves. 762 295 D00, J03, D05
5. RR and QT interval in ECG. 762 297 D16
6. R-R interval and its significance. 763 — D18(RS3)
7. QRS complex. 764 296 D15(RS3)
8. PR interval. 764 296 J08(RS2), J09(RS2)
9. Mean electrical axis of QRS vector. 769 300 D14
10. Paroxysmal tachycardia. 771 304 J10(RS2)
11. Heart block. 772 300 J10(RS2)

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	GKPAL	AKJN
12. Explain what is incomplete and complete heart block.	772	301 J10
13. Ventricular fibrillation.	772	305
14. Stokes Adam syndrome.	773	301 J10(RS2) J10(RS2)
Short Answers		
1. Einthoven's triangle.	760	297
2. What is the role of augmented limb leads?	760	299 J06(RS2)
3. Waves of EEG.	761	295 D16(RS3)
4. List chest leads of ECG. Give their location.	761	297 D07(RS2) J12
5. Draw a labeled diagram of normal electrocardiogram recorded from lead II.	762	295 D07(RS2), D10(RS2), D98, D99, J01, D01, D04, J13
6. PR interval in ECG—define, normal value, events occurring, significance.	762	296 D16(RS3), J17(RS3), J98, J99, D02, D03, D09, D12
7. Importance of QT interval of ECG.	762	297 D13
8. Give the cause of the 'P' wave of the ECG. Explain the abnormalities of 'P' wave of ECG. State two conditions which alter this wave.	768	295 J05(RS2), D16
9. What is the cause of 'T' wave in the ECG? In which leads is it inverted normally?	769	295 J09
10. Sinus arrhythmia—define and causes.	771	— D11(RS3), D12(RS3), D17(RS3)
11. What is bundle of Kent and what ECG changes are demonstrated in its presence?	773	306 D08
CHAPTER 89: CARDIAC CYCLE		
Long Essays		
1. Define cardiac cycle. Explain with the help of a diagram the mechanical changes during cardiac cycle.	778	287 D15(RS3), J00, J14
2. Explain the phases of a normal cardiac cycle. Draw left ventricular pressure tracing.	778	287, 289 D12

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	GKPAL	AKJN
3. With the help of a labeled diagram describe the changes in left ventricular pressure during cardiac cycle.	—	289 D05
4. Draw a neat labeled diagram of the cardiac cycle, correlating it with pressure and volume changes. Explain the events in detail.	779	289 J09(RS2)
Short Essays		
1. Left ventricular pressure changes.	—	—
2. Describe phonocardiogram.	—	— D08
3. Give the normal value of end-diastolic ventricular volume. Name two factors that increase this volume and explain its significance in ventricular function.	—	288 J12 J05
4. Normal cardiac cycle.	778	—
5. Ventricular events of cardiac cycle.	779	287 J99 D11(RS3), D06
6. Draw the diagram of left ventricular pressure-volume loop and explain the causation of component segments.	782	— D15
7. Describe right atrial pressure changes during cardiac cycle.	783	290 D10
8. <u>Jugular venous pulse tracing</u> (causes of each wave).	783	290 D09(RS2), J13(RS3), J16(RS3), J17(RS3), J08
9. <u>First and second heart sounds.</u>	784	291 J06(RS2)
10. Heart sounds and murmurs.	784	291 J13(RS3), J18(RS3)
11. How are heart sounds produced? Mention their characteristics and clinical significance?	784	291 D98
12. Tabulate the differences between first and second heart sounds. Add a note on splitting of II heart sound.	784	291 D07(RS2)
13. Explain the causes of four heart sounds during cardiac cycle. How are these recorded?	784	291 J08
Short Answers		
1. Write briefly the right ventricular pressure changes during cardiac cycle.	—	— J09
2. Write briefly on volume changes in the ventricles during cardiac cycle.	—	— J09

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	GKPAL	AKJN	
3. Phonocardiogram.	—	—	D12(RS3)
4. Differentiate first and second heart sounds.	—	291	J12(RS3), D14(RS3), J00, J01
5. Jugular venous pulse (labeled diagram).	783	290	J18(RS3), D05
6. Explain the causes of heart sounds.	784	291	D07
7. First heart sound—describe.	784	291	D11
8. Second heart sound—describe, cause.	784	291	J06, J12

CHAPTER 90: CARDIAC OUTPUT

Long Essays

1. Describe cardiac output. Give its normal resting value. How is it regulated?	787, 794	342	D13(RS3), J15(RS3)
2. Define cardiac output. Discuss factors affecting it. Add a note on left ventricular failure.	787, 790	342, 394	D16
3. Define cardiac output and cardiac index. Give their normal values. Describe the factors, which regulate cardiac output and mention any one method of its determination.	787, 790, 342, 345	J15	
4. What is the normal cardiac output? Describe the various methods used for determining it. Write a note on cardiac index.	787	342, 345	J12
5. Discuss the regulation of cardiac output. Write a note on cardiac reserve.	794, 788	342	D06(RS2)

Short Essays

1. Define cardiac output and mention the factors regulating it. Describe one method of its measurement.	787, 794, 342, 345	J98, D99, J01, D01, J06, J08
2. Define Fick's principle. Give details of estimation of cardiac output based on it.	789	345
3. Describe the measurement of cardiac output by dye-dilution technique.	789	346
4. Explain how preload affects cardiac output.	791	344
5. Venous return.	791	D12
6. Explain factors influencing (promoting) venous returns.	791	344
		D12(RS3), D11(RS3), D17(RS3), D01

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Short Answers

1. Define stroke volume. Give its normal value.	787	342	J14
2. Cardiac index.	787	342	
3. Define cardiac reserve.	788	342	J06(RS2), D11
4. Name the methods of measurement of cardiac output.	788	345	D15(RS3)
5. State Fick's principle. Explain how it is applied to determine cardiac output.	789	345	J18(RS3), J00, D00, D02, D03, D11
6. Venous return.	791	344	J13(RS3)
7. Name the factors increasing the venous return to right atrium.	791	344	D98, J09

CHAPTER 91: HEART RATE AND ARTERIAL PULSE

Long Essay

1. Describe the baroreceptors control of heart rate. Name six other affecting the heart rate.	798	340	D03
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Short Essays

1. What is normal heart rate? How is it regulated (nervous regulation)?	797	339	J99, J08
2. Explain the effects of vagal stimulation on heart.	798	328	J13
3. Describe the normal 'arterial pulse' and 'jugular venous pulse'.	799, 783	—	D12
4. Water-Hammer pulse.	800	—	D08(RS2)

Short Answers

1. What is Bain bridge reflex? What is its importance?	798	334	D11(RS3), J16(RS3), J01, J02, D02, J11
2. Draw a labeled diagram of arterial pulse.	799	—	J07
3. What is bradycardia? In which subjects is it observed physiologically and explain the reason?	800	339	D08

CHAPTER 92: PRINCIPLES OF HEMODYNAMICS

Short Essays

1. What is Hagen's Poiseuille's law? Write the formula and explain its application.	805	319	J08(RS2), D10(RS2), D14(RS3)
		—	Contd... —

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	GKPAL	AKJN	
2. Poiseuille-Hagen formula. Name two factors the normally alter in it and explain the effect of each.	805	319	J04, D09
3. What is turbulent flow of blood? Where is it taking place physiologically? How it is measured?	805	320	D08
4. Peripheral resistance.	806	352	D99

Short Answers

1. Write the Poiseuille-Hagen formula and state its importance.	805	319	J05(RS2), J06
2. What is Reynold's number and what is its significance?	805	320	D10(RS2), D10, J15
3. Peripheral resistance and factors influencing it.	806	352	J18(RS3), J99

CHAPTER 93: ARTERIAL SYSTEM**Short Essay**

1. Korotkoff's sounds.	812	—	J06(RS2)
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CHAPTER 94: VENOUS SYSTEM

None

CHAPTER 95: CAPILLARY CIRCULATION**Short Essays**

1. Capillary circulation.	816	358	D05(RS2)
2. What is micro-circulation and explain the pressures in it.	819	—	J09
3. Explain dynamics of capillary fluid exchange. How is it affected in hypoproteinemia.	819	—	D06(RS2)
4. Describe tissue fluid formation and explain two mechanisms which produce edema.	819	—	J05(RS2)
5. Describe Starlings forces affecting fluid exchange in at capillary level. Explain the role of each force acting across capillaries in tissue fluid formation.	819	—	J07
6. Define edema. Describe mechanism of edema.	820	—	D07

Short Answers

1. Physiological shunt.	—	—	J99
2. List two factors affecting capillary fluid shift.	—	—	J15

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	GKPAL	AKJN	
3. Name two locations of fenestrated capillaries. Specify their function.	817	316	D03
4. Enumerate four factors affecting tissue fluid formation.	819	—	D14

CHAPTER 96: REGULATION OF BLOOD PRESSURE**Long Essays**

1. Define arterial blood pressure. Discuss the factors regulating the blood pressure.	823, 826	349, 351	D14(RS3), J98, D08
2. Define systolic and diastolic blood pressure and give their normal values. Describe the short-term mechanism for regulation of blood pressure.	823, 826	350, 353	D10(RS2), D14
3. Define systolic and diastolic blood pressure and give their normal values. Explain the baroreceptor reflex mechanism for regulation of blood pressure.	823, 829	350, 353	J14(RS3)
4. Define blood pressure, mean arterial pressure and pulse pressure. Discuss the long-term regulatory mechanisms of blood pressure.	823, 837	349, 354	D07(RS2)
5. What is the normal arterial blood pressure? How is it measured and regulated?	823, 811	350, 353	D05(RS2)
6. Describe the role of carotid sinus in the regulation of arterial blood pressure.	829	—	D98

Short Essays

1. Describe the actions of angiotensin II (in regulation of blood pressure).	—	512	D05, D16
2. Define 'mean arterial pressure' and explain the importance of maintaining it.	824	350	D13(RS3)
3. Describe the nervous regulation of blood pressure.	826	353	J12
4. Describe the role of vasomotor center in regulation of arterial blood pressure.	828	331	D10
5. Describe the <u>sinoaortic reflex</u> and its importance.	829	—	J12(RS3), D15(RS3), D02, J03, D04, D06
6. Baroreceptors.	829	332	J08(RS2)
7. Baroreceptor reflexes.	829	334	J06(RS2)
8. Describe the role of baroreceptors in regulation of blood pressure.	829	353	D13

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	GKPAL	AKJN
9. Describe the role of chemoreceptors in regulation of blood pressure.	833	353 J13
10. Describe how Cushing's reflex is activated and its effect on systemic blood pressure.	833	339 J11(RS2)
11. Describe the role of different hormones in regulation of blood pressure.	836	— D09
12. Rennin-angiotensin system in regulation of blood pressure.	836	355 J06(RS2), D08(RS2), D00
13. Rennin-angiotensin-aldosterone axis.	837	— D07(RS2)
14. Long-term regulation of arterial blood pressure.	837	354 J99, J14

Short Answers

1. Find out mean arterial blood pressure, if systolic pressure is 120 mm Hg and diastolic pressure is 90 mm Hg.	824	350 D10
2. Four factors influencing systolic blood pressure.	824	351 D99
3. Name the arterial baroreceptors. How are they stimulated? Mention two effects of stimulation of baroreceptors.	826	333 D06(RS2)
4. Explain the direct effect of CO_2 and hypoxia on vasomotor center.	828	332 D10
5. Name the Baroreceptors regulating blood pressure.	829	353 J15
6. Define Marey's law. What is its basis? Mention one condition which is an exception to this.	832	339 D13(RS3), D00, J03
7. Location and innervation of peripheral chemoreceptors.	833	335 J05
8. What is Cushing's reaction? What is its importance? How it restores blood pressure?	833	339 D01, D04, J08, D14
9. What is importance of renin angiotensin mechanism?	836	512 J08

CHAPTER 97: INTEGRATED REGULATION OF CARDIOVASCULAR FUNCTIONS**Short Essay**

1. Draw a labeled graph to show auto-regulation of blood flow. Explain any one mechanism by which it occurs.	842	325 J05
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	GKPAL	AKJN
Short Answers		
1. Sympathetic and parasympathetic tone.	840	328 J08(RS2)

CHAPTER 98: REGIONAL CIRCULATIONS**Long Essay**

1. Describe in detail the coronary circulation and the factors influencing it.	848	361 D11
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Short Essays

1. Describe the characteristic features of — cutaneous circulation.	845	378 D13
2. Describe the characteristic features of — splanchnic circulation.	847	383 J13
3. Peculiarities of cerebral circulation.	847	— J17(RS3)
4. Regulation of <u>cerebral circulation</u> (blood flow).	847	369 J07(RS2), J16(RS3), D16(RS3)
5. Describe the mechanism of auto-regulation of cerebral blood flow.	847	370 D09
6. <u>Coronary circulation and its special features.</u>	848	361 J05(RS2), D08(RS2), J15(RS3), J98, D98, D06
7. Give the value of resting coronary blood flow and describe the phasic variation of coronary blood flow during cardiac cycle.	849	363 D11(RS3)
8. Explain the factors influencing coronary circulation (regulation of coronary circulation).	849	364 D00, D01, J03, J12
9. Describe the mechanism of auto-regulation of coronary blood flow.	849	364 D13
10. Role of adenosine in blood flow regulation.	849	365 D08(RS2)
11. Triple response (reaction).	853	379 J08(RS2), D16(RS3), D11

Short Answers

1. Enumerate the factors governing oxygen consumption by the heart.	—	D07(RS2)
2. Name two techniques to monitor regional blood flow in the brain.	—	D03

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Contd...	GKPAL	AKJN	
3. List the factors influencing cerebral circulation.	847	369	J00, D05
4. Explain the phasic nature of coronary blood flow.	848	363	D02, D12
5. List four factors influencing coronary blood flow.	849	366	J14
6. What is 'angina pectoris'? Explain the basis of it with a diagram.	850	307	J07(RS2), J99
7. Cutaneous blood flow.	852	378	J07
8. Explain what is 'axon reflex'?	853	330	D15(RS3), J10, J15, D16
Triple response	853	379	J06(RS2), D06(RS2), J09(RS2), D14(RS3), J98, J99, J00, D00, J02
10. Write a note on skeletal muscle blood flow.	857	381	D11
CHAPTER 99: FETAL CIRCULATION	None		
CHAPTER 100: PATHOPHYSIOLOGY OF HYPERTENSION AND HYPOTENSION			
Short Essay			
1. What is meant by Goldblatt hypertension? Explain the underlying mechanism of hypertension.	863	398	D15
Short Answers			
1. What is hypertension? What are the causes leading to secondary hypertension?	861	396	J09
2. <u>Physiological basis of a drug in hypertension.</u>	864	—	D10(RS2)
3. What is <u>postural hypotension?</u>	865	389	J16(RS3), D16(RS3)
CHAPTER 101: PATHOPHYSIOLOGY OF SHOCK			
Long Essays			
1. Explain the role of arterial baroreceptors soon after blood loss. Name the other compensatory mechanisms available.	—	391	J05(RS2)

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Contd...	GKPAL	AKJN	
2. What is shock? Classify shock. Discuss the various types and physiological basis of treatment.	866	390	J10(RS2)
3. Describe the circulatory changes to moderate blood loss.	867	391	D13
4. Describe the physiological basis of 'irreversible shock'.	868	394	J13
5. Explain the cardiovascular adjustments following: (a) Moderate exercise, (b) Hemorrhage. Add a note on 'irreversible shock'.	1259, 867, 868	482, 394	J07(RS2)
Short Essays			
1. Define shock. What are the causes of shock? What is meant by irreversible shock?	866, 868	390	J02, J12
2. List four features of hemorrhagic shock. Explain the basis of any two features.	867	390	J05
Short Answers			
1. Classify types of shock.	866	390	D11
2. Mention four compensatory mechanisms in hypovolemic (circulatory) shock.	867	391	D99
3. Explain the mechanism of refractory shock.	868	394	D09
4. Explain what is irreversible shock.	868	394	D10
CHAPTER 102: PATHOPHYSIOLOGY OF HEART FAILURE			
Short Essay			
1. Describe the manifestations of congestive heart failure.	873	394	J10
Short Answer			
1. Explain the principles of cardiac resuscitation.	—	—	D13
Section 10: RESPIRATORY SYSTEM			
CHAPTER 103: FUNCTIONAL ORGANIZATION OF RESPIRATORY SYSTEM			
Short Essays			
1. Explain nonrespiratory functions of lungs.	884	407	D07
2. Functions of upper respiratory passage.	884	407	J07(RS2), D13(RS3)

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	GKPAL	AKJN
Short Answers		
1. List the functions of nasal cavity.	884	—
2. Functions of conducting zone of respiratory tree.	884	J01, D01, D04, D14
3. List four nonrespiratory functions of respiratory system.	884	407
CHAPTER 104: MECHANICS OF BREATHING		J06(RS2), D03
Long Essays		
1. With the help of graphs, explain the mechanism of air entry and exit from the lungs.	891	412
2. Describe how expansion of thorax is brought about during eupnea.	891	411
3. Describe the mechanics of respiration. Define lung compliance. Mention two conditions which reduce lung compliance.	891, 894	411, 422
4. Draw a labeled graph to show the lung volumes and capacities and give the normal values of each. Give the significance of volume of air left in lungs after maximal expiration.	893	415
Short Essays		D03
1. Explain why the alveoli remain dry.	—	420
2. Name the muscles of inspiration and expiration. Explain the role of inspiratory and expiratory muscles in normal respiration.	887	411
3. Give the nerve supply and functional importance of diaphragm.	887	411
4. What is the intrapleural pressure? What are the variations in different phases of respiration?	889	414
5. Draw a graph to show changes in intrapleural pressure during a normal respiratory cycle. Explain the basis of the changes.	890	414
6. Describe the mechanics of breathing. What are the factors necessary in automatic breathing?	891	411
7. Draw a labeled diagram showing subdivisions of lung volume.	893	415
		— D05

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	GKPAL	AKJN	
8. Spirogram.	893	415	J13(RS3)
9. Draw a spirogram indicating various lung volumes and capacities.	893	415	J01, J09
10. Vital capacity.	893	416	D14(RS3), D17(RS3), D00, D06, J15
11. Lung compliance—describe, name factors affecting it, condition where it is increased and decreased.	894	421	X
12. Pulmonary surfactant—chemical composition and functions.	899	419	J14(RS3), J15(RS3), D18(RS3)
13. Name the source and chemical nature of lung surfactant. Explain its role in respiration. Indicate the consequences when it is deficient.	899	419	J06(RS2), D98, J00, J01, J02, D05, J11
14. Explain respiratory distress syndrome (hyaline membrane disease). Add a note on 'pulmonary surfactant'.	900	420	D06(RS2), J11(RS2), J06, D16
15. Timed vital capacity and its clinical significance.	903	416	J17(RS3), J03, D14
16. Draw a labeled diagram showing FEV-1 in normal and restrictive conditions.	903	417	J07
Short Answers			
1. Name two muscles each of: (a) Normal respiration, (b) Forced inspiration.	887	411	D10(RS2)
2. What are accessory muscles of inspiration? Name them.	888	413	J05
3. Name the expiratory muscles.	888	413	D03
4. What is normal intrapleural pressure? What is its significance? Draw a labeled graph to depict the intrapleural pressure changes during quiet respiration.	889	414	D98, D10
5. Transpulmonary pressure.	891	—	J98
6. Explain the mechanism of ventilation during quiet breathing.	891	411	J13
7. Mention any four lung volumes and its normal values.	892	415	D99
8. Tidal volume	892	415	J18(RS3)
9. Define tidal volume and residual volume. Give their normal values.	892	415	J12(RS3)
10. Define the following giving their normal values: (a) Inspiratory reserve volume, (b) Vital capacity.	892	415	D01, D04

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	GKPAL	AKJN
11. Define 'tidal volume' and 'anatomical dead space'. Give normal values.	892	415, 426 D13.
12. Draw and label different lung volumes and capacities.	893	415 D07
13. Define residual volume and functional residual capacity. Give normal values.	893	415 D09, J14
14. Functional residual capacity (normal value and importance).	893	416 J11(RS2), D13(RS3), J15(RS3), J98, J08
15. Define vital capacity. Give its normal value. Name two physiological conditions where it is decreased.	893	416 D18(RS3), D99, J04, J15
16. Define: (a) Vital capacity and (b) Timed vital capacity.	893, 903	416 D98
17. What is lung compliance? What are its normal values? And in what conditions it is variable.	894	421 D12(RS3), J09, D11
18. Give the source, chemical nature and functions of pulmonary surfactant.	899	419 J08(RS2), D14(RS3), D99, D12
19. Explain respiratory distress syndrome (hyaline membrane disease) with its causes in adults and infants?	900	420 J00, D00, D01, D02, D04, D08
20. Explain factors affecting airway resistance.	902	423 D07, D14
21. Timed vital capacity and its importance.	903	416 D06, J13, D16
22. Forced expiratory volume (FEV ₁)— Clinical importance.	903	417 J14(RS3), J98
23. Maximal mid-expiratory flow rate (MMEFR).	904	417 J06
24. Work of breathing.	905	423 J06

CHAPTER 105: ALVEOLAR VENTILATION AND GAS EXCHANGE IN LUNGS

Long Essay

1. Describe the factors affecting diffusion of gases at the alveolar capillary membrane. Explain how to determine the diffusion capacity of lungs.

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Short Essays

GKPAL AKJN

1. Describe the mechanism of gaseous exchange in the lungs. — J13
2. Oxygen uptake at lungs. —
3. Dead space (definition, types, measurement). 907 426 J13(RS3)
D08(RS2) A
4. What is anatomical and physiological dead space? Describe a method to determine anatomical dead space. 907 426 D10
5. Physiological dead space. 907 426
6. Differentiate anatomical and physiological dead space. Describe one method to measure anatomical dead space. 908 426 D18(RS3)
D00
7. Describe the factors affecting diffusion of gases through alveolo-capillary membrane. 911 429 J07(RS2)

Short Answers

1. What is the difference between anatomical and physiological dead space? — D10(RS2)
2. Explain the term 'partial pressure' of a gas and draw a graph to show the value of PO₂ in the: (a) Atmosphere, (b) Alveoli, (c) Arterial blood, (d) Mixed venous blood. 406 J05(RS2)
3. Define "dead space" air and give its importance. Give its normal value. 907 426 J11(RS2),
J04, J06
4. What are the types of dead space? Give their normal values. 907 426 J15
5. Physiological dead space. 907 426 D05(RS2),
D15(RS3)
6. How is alveolar ventilation calculated? 909 425 D15
Give the formula.
7. Calculate alveolar ventilation at a respiratory rate of 12 per minute, tidal volume of 400 mL and dead space air of 100 mL and comment. 909 425 J05
8. Explain alveo-capillary membrane (respiratory membrane) with a labeled diagram. 910 405 J01, J03, J04
9. Normal values for O₂ and CO₂ tensions in air, alveoli and blood. 912 407 J06(RS2)

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	GKPAL	AKJN
10. Give in a tabular column PO_2 of atmospheric, inspired, alveolar and expired air.	912	407 J12
11. Give the normal partial pressure of oxygen and carbon dioxide in the arterial and venous blood.	912	407 J02

CHAPTER 106: PULMONARY CIRCULATION AND VENTILATION-PERFUSION RATIO

Short Essays

1. Describe peculiarities (characteristic features) of pulmonary circulation.	915	385 D08, D09
2. Define and give examples of ventilation-perfusion ratio.	918	427 D07(RS2), D10(RS2)

Short Answers

1. What is pulmonary edema? Name one condition where it is seen.	918	385 J16(RS3)
2. Increase of which capillary pressure in pulmonary circulation leads to pulmonary edema and explain the reasons.	918	— J09
3. Ventilation-perfusion ratio and its normal value and significance.	918	427 D12(RS3), D17(RS3), D14

CHAPTER 107: TRANSPORT OF GASES IN BLOOD

Long Essays

1. Explain oxygen transport from the lungs to the tissues. Add a note on oxygen dissociation curve. Write a note on Bohr's effect.	922, 924	434 D15(RS3), J16(RS3), D11
2. Describe oxygen dissociation curve and explain the factors that cause right shift and left shift of dissociation curve.	924, 927	435 D08
3. Describe in detail the various methods of carbon dioxide transport in the blood. What is Haldane's effect?	928, 930	438 D11(RS3), D10

Short Essays

1. Oxygen transport in the blood.	922	434 J99, J08, J11, D13
2. Describe oxygen dissociation curve with a labeled diagram and factors affecting it. Give the significance of its shape. What is $P50$?	924	435 D05(RS2), D06(RS2), J07(RS2), D10(RS2), D14(RS3), D16(RS3), J04, J14, D16

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	GKPAL	AKJN	
3. Carbon dioxide transport in the blood.	928	438	J14(RS3), J98, D09
4. In which forms CO_2 is carried in blood? Describe chloride shift.	928	438	D08(RS2), J09(RS2), J12(RS3), D02, D04
5. Describe the carbon dioxide transport in the bicarbonate form.	929	438	D12
6. Draw 'carbon dioxide dissociation curve'. Explain 'Haldane effect'.	929	439	D12(RS3)
7. Chloride shift.	929	440	D09(RS2), J17(RS3), J10
8. Bohr effect and Haldane effect.	930	435, 439	J15(RS3), J18(RS3)

Short Answers

1. Give the volume of carbon dioxide transported in arterial and venous blood. What is the significance of arterial pCO_2 ?	439	J07(RS2)
2. Give the normal content of oxygen and carbon dioxide in blood.	437, 439	J04
3. Oxygen dissociation curve with a labeled diagram.	435	D08(RS2), J00
4. Define $P50$.	437	J12
5. What are the effects of 2,3-diphosphoglycerate on oxygen-hemoglobin dissociation curve?	435	J10
6. Explain the role of myoglobin in oxygen transport.	436	J10, D10
7. List the factors that cause the oxygen dissociation curve to shift to the left.	436	D12
8. Name the forms in which carbon dioxide is transported in blood. Give its content in arterial blood.	438	J15(RS3)
9. Chloride shift.	440	D18(RS3)
10. What is Hamburger's phenomenon and where is it taking place?	440	J08
11. Explain Bohr effect and its physiologic significance.	435	D16(RS3), D02, J06, D16
12. What is Haldane's effect? Where is it taking place? How is it beneficial?	439	J00, J01, J02, J03, J08, J12, J14, D15

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GKPAL AKJN

CHAPTER 108: REGULATION OF RESPIRATION

Long Essays

1. Name the respiratory centers. Explain the neural regulation of respiration. What is apneusis? Add a note on "Ondine's curse". Add a note on 'Hering-Breuer' reflex/add a note on periodic breathing. 932, 943, 444, 447, D05(RS2), J12(RS3), D16(RS3), J98, D01, J08, J09, J11, D12, D16

2. What are chemoreceptors? Describe the chemical control of respiration. Add a note on Cheyne-Stokes breathing. 937, 959 449, 456 D12(RS3), D99, J06

3. Give the normal tensions of respiratory gases in arterial and venous blood. Describe in detail chemical control of respiration. 937 449 J05

Short Essays

1. Give the location of respiratory centers. 932 Explain how muscular exercise alters respiration. 444 D03

2. Location and functions of centers of respiration. 932 444 D17(RS3)

3. Medullary respiratory centers. 932 444 J14(RS3)

4. Describe the chemical control of respiration. 937 449 J08(RS2), J11(RS2), D06

5. Chemoreceptors. 937 449 J99

6. Name the peripheral chemoreceptors. 937 Where it is present. How it will regulate respiration. 449 J02

7. Explain Herring-Breuer inflation reflex. 943 What is its importance? 447 D07

8. Cough reflex. 944 448 D08(RS2)

Short Answers

1. What are the functions of pneumotaxic center? 934 445 J15

2. Explain the voluntary control of respiration. 936 446 D09

3. List any four afferents that stimulate respiratory center. 936 447 D98

4. Explain the chemical control of respiration. 937 449 D13

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GKPAL AKJN

5. Herring-Breuer reflexes. 943 447 J06(RS2), J11(RS2), J16(RS3), J12, J15

6. Explain Herring-Breuer inflation reflex. 943 447 D06(RS2)

7. What are 'J' receptors? How are they stimulated and their reflex effects? 943 447 D15

8. What is the importance of cough reflex? 944 — J11

CHAPTER 109: PHYSIOLOGICAL CHANGES AT HIGH ALTITUDE

Long Essay

1. Describe the mechanism of acclimatization to high altitudes. 947 473 J99

Short Essays

1. List the effects of hypoxia at high altitude on body, specifying the mechanism for the change. 947 471 D98

2. Describe changes that occur during acclimatization to high altitude (low PO₂). 948 473 D15(RS3), J00, J08, J11, D11

Short Answers

1. List four changes during acclimatization to high altitude. 948 473 J04

2. Acute mountain sickness. 949 472 J10(RS2)

CHAPTER 110: HYPOXIA AND OXYGEN THERAPY

Long Essay

1. Define hypoxia. Classify hypoxias and explain the features seen in the different types of hypoxia. 950 461 J09(RS2), D13(RS3)

Short Essays

1. Classify and explain 'hypoxia'. Give examples for each type. Mention distinguishing features of each type of hypoxia. Explain the role of oxygen treatment in the different types of hypoxia. 950 461 J06(RS2), D06(RS2), D09(RS2), D10(RS2), D12(RS3), J18(RS3), J02, D02, D04, J15

2. Classify hypoxia. Explain any two of them. 950 461 J17(RS3)

3. Describe the causes and blood gas status of any type of hypoxia. 950 461 J07

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	GKPAL	AKJN	
4. Oxygen therapy.	952	465	J09(RS2)
5. In which type of hypoxia oxygen therapy is most helpful? What are the effects of excess oxygen administration (oxygen toxicity)?	952	465	D15

Short Answers

1. Two differences between hypoxic and histotoxic hypoxia.	465	D16
2. Classify hypoxia (anoxia). Give example for each one of them.	950	461
3. Define hypoxia. Explain histotoxic hypoxia.	950	461
4. Describe anemic hypoxia.	950	463
5. What is 'stagnant hypoxia'? How does this type of hypoxia affect arterial PO_2 and oxygen content of blood?	951	463
6. Hyperbaric oxygen.	952	466
		J10(RS2)

CHAPTER 111: HAZARDS OF DEEP SEA DIVING AND EFFECTS OF INCREASED BAROMETRIC PRESSURE**Short Essay**

1. Caissons disease (decompression sickness)—causes, manifestation and treatment.	955	477	J16(RS3), D00, D02, D04, D15
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Short Answers

1. What is dysbarism?	955	477	D14(RS3)
2. Caissons disease/decompression sickness.	955	477	D18(RS3), D06

CHAPTER 112: RESPIRATION IN ABNORMAL CONDITIONS AND ABNORMAL RESPIRATIONS**Short Essays**

1. What is dyspnea, dyspneic index? In what conditions is dyspnea observed?	455	J09
2. Explain dyspnea and apnea with examples.	455	D17(RS3)
3. Cyanosis.	—	467
4. What is asphyxia? Explain its stages/ features (changes occurring).	957	456
5. Define periodic breathing, and explain its occurrence in various diseases.	958	456
		J10(RS2), J15(RS3) D07(RS2), J01, D01, D11 D07(RS2), D14(RS3)

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Short Answers

	GKPAL	AKJN	
1. How do you differentiate Biot's breathing from Cheyne-stokes breathing?	—	—	J10
2. Deglutition apnea.	—	—	J06
3. Central cyanosis.	—	—	J17(RS3)
4. Apnea.	—	455	J18(RS3)
5. Name any four causes of apnea.	—	455	D98
6. Define dyspnea and apnea.	—	455	J15
7. Dyspnoeic index and its normal value.	—	455	J14(RS3), D14
8. What is cyanosis? How is it produced? What are its types?	—	467	J06(RS2), D11(RS3), J18(RS3), D98, D00, J03, D11
9. Asphyxia and its effects.	957	456	D03, D06
10. Periodic breathing and its types with examples.	958	456	J08(RS2), D08(RS2), J00, J02, J11, J12
11. What is Cheyne-Stokes respiration? Name one condition where it is seen.	959	456	J14(RS3)
12. Explain the features of Biot's breathing. In what pathological conditions is it seen?	959	457	D10

CHAPTER 113: ARTIFICIAL VENTILATION AND CARDIOPULMONARY RESUSCITATION**Short Essay**

1. Artificial respiration—various methods.	961	—	D11(RS3), D99, J12
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Short Answers

1. What is positive pressure breathing and its application?	961	—	D15
2. Artificial respiration—principles, methods.	961	—	D16(RS3), J13

CHAPTER 114: PULMONARY FUNCTION TESTS**Long Essay**

1. Classify and briefly describe pulmonary functions tests in common use.	965	480	J07
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Short Essay

1. Lung function tests.	965	480	J08(RS2)
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Contd...	GKPAL	AKJN
Short Answer		
1. List lung volumes and capacities.	965	415
		J11
Section 11: NEUROPHYSIOLOGY		
CHAPTER 115: FUNCTIONAL ORGANIZATION OF NERVOUS SYSTEM		
Short Essay		
1. Name the glial cells. Describe their functions.	977	141
		D10
Short Answers		
1. Draw a cross section of the spinal cord — and label the prominent structures.	895	D06
2. Name the types of neuroglia and mention their functions.	977	141
	D99, J00, D02, J03, D12, D16	
3. Astrocytes.	977	141
	D09(RS2), J13(RS3), D13	
4. Microglia.	978	141
	D13(RS3)	
CHAPTER 116: SYNAPTIC TRANSMISSION IN CENTRAL NERVOUS SYSTEM		
Long Essay		
1. Describe the structure of a chemical synapse with a diagram and the steps involved in transmission across such a synapse. Explain any two properties of synapses.	982, 984, 858 987	J08(RS2), D01
Short Essays		
1. Compare the mechanism of pre-synaptic inhibition with that of post-synaptic inhibition, with diagrams.	—	D99
2. Define and classify synapses. Explain the two properties of synapse (occlusion and subliminal fringe).	858	J08
3. Draw and label a synapse.	982	858
4. Explain the steps of synaptic transmission. Name any one inhibitory neurotransmitter substance.	984	859
5. Explain EPSP and IPSP.	986	859
6. List the properties of synapse. Explain any three properties of synapses.	987	865

Contd... —

Contd...	GKPAL	AKJN
7. Write a brief note on postsynaptic potential.	988	859
8. Describe the different types of inhibition at the synapse.	988	862
9. What are the types of summation and how are they demonstrated?	989	860
10. Summation and occlusion in synaptic transmission.	989	866
11. Explain the differences between muscarinic and nicotinic actions of acetylcholine.	991	1048
Short Answers		
1. Explain synaptic fatigue.	—	865
2. Synapse.	981	858
3. What is synapse? Mention three types of synapses in nervous system.	981	858
4. What is IPSP and EPSP in the synapse?	986	859
5. Important features of EPSP.	986	859
6. List four features of synaptic transmission.	987	865
7. List four properties of a synapse.	987	865
8. Synaptic delay.	987	866
9. Explain the role of synaptic inhibition.	988	862
10. Explain Renshaw's cell inhibition.	988	863
11. Explain presynaptic inhibition with a diagram.	988	864
12. Different types of summation in neurons.	989	860
13. Explain the property of synaptic occlusion.	989	866
14. Name the neurotransmitters in the CNS.	990	1047
15. GABA.	992	1051
CHAPTER 117: INTRODUCTION TO SENSORY SYSTEM AND PHYSIOLOGY OF RECEPTORS		
Long Essay		
1. Classify sensory receptors. Give examples for each. Explain their properties.	996	870
	J11(RS2), D17(RS3), J04	

Contd... —

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	GKPAL	AKJN	
Short Essays			
1. Give the classification of receptors.	996	870	D11, D12
Describe properties of receptors.			
2. Generator potential.	999	873	D98
3. Name the cutaneous receptors. How is receptor potential developed?	1000, 996	871	J11
4. Properties of sensory receptors.	1000	875	D12(RS3)
5. Explain adaptation of sensory receptors and its significance with examples.	1000	875	D05(RS2)
6. Explain the basis of: (a) Intensity discrimination, (b) Localization of stimulus.	1000	874, 876	D06(RS2)
Short Answers			
1. Classify sensory receptors (axons) and their functions.	996	870	D05(RS2), J06
2. Name three touch receptors. Enumerate three properties of them.	997	871	J16(RS3)
3. Name the thermoreceptors in the skin.	997	872	D15
4. Thermal receptors and their location.	997	872	D06(RS2), J04, J07
5. Pacinian corpuscle.	997	872	J07(RS2), D98
6. Weber Fechner's law.	1000	874	J11
7. Explain the mechanism and purpose of 'adaptation' observed in certain sensory 'receptors'.	1000	875	D13
8. Explain the "Muller's doctrine" of specific nerve energies.	1000	876	D08, J11
9. Law of projection.	1000	876	J11
10. What is Phantom limb? Explain law of projection.	1000	876	D09, J14
11. Phantom limb and its basis.	1000	876	D05(RS2), J11(RS2), J98, J02
CHAPTER 118: SENSORY COMMUNICATION TO SPINAL CORD			
Short Essays			
1. Epicritic and protopathic sensations.	—	—	J99
2. What are synthetic senses? Give examples.	—	907	J05
Short Answers			
1. Define sensory unit and dermatome.	1002	893	J08

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	GKPAL	AKJN	
2. What is Bell-Magendie's law? What is the exception to this law?	1004	—	D16(RS3), D05, J11
CHAPTER 119: ASCENDING PATHWAYS			
Long Essays			
1. Describe the dorsal column tract and its functions. How its functions are affected in Brown Segard's syndrome	1008, 1038	895, 938	J16(RS3)
2. Trace the pathway for touch sensation with the help of diagram. What are the effects of "Tabes dorsalis" on sensory functions?	1010, 1038	895, 940	D11(RS3), J12(RS3)
Short Essays			
1. Name the sensory tracts and explain the origin, course and termination of ventral spinocerebellar tract.	1008	895, 897	J11
2. Describe the pathway of fine touch with a labeled diagram (dorsal column) from right hand. List other sensations carried by this pathway.	1008	895	J98, D99, D08
3. What is Rhomberg's sign and in what diseases this sign is positive?	1012	—	D07
Short Answers			
1. Explain the effects of unilateral lesion of 'dorsal nerve roots'.	—	—	D13
2. Explain the origin, course and functions of dorsal spinocerebellar tract.	—	897	D09, J14
3. Name the ascending tracts and sensations carried by them.	1008	895	J07
4. Name the tracts in posterior white column of spinal cord. What sensations are carried by these tracts?	1008	895	J11
5. Draw the diagram showing dorsal column lemniscal system.	1008	895	J08(RS2)
6. List the sensations carried by the dorsal column tract.	1008	896	J05(RS2)
7. Explain stereognosis.	1011	907	J10(RS2), J02
8. Dissociated anesthesia.	1011	940	D07(RS2)
CHAPTER 120: PHYSIOLOGY OF PAIN, ITCH AND TEMPERATURE			
Long Essays			
1. Describe the pain pathway. Write important features of fast and slow pain.	1014	896, 903	J14(RS3)

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	GKPAL	AKJN
2. Trace the pathways for different types of pain. What are the endogenous pain inhibitory pathways? Write a note on visceral pain.	1016, 1020, 1018	896, 904 D98
3. Draw diagram to show the somatic pain pathways from: (a) Limbs/Soma, (b) Face. Explain the endogenous analgesia system (four ways by which pain sensations can be blocked).	1017, 1025, 1020	896, 904 J05(RS2), D03
4. Draw a neat labeled diagram of 'fast pain' pathway from <u>left lower limb</u> . Explain 'referred pain'.	1017, 1019	896, 904 D13(RS3)
Short Essays		
1. Pathways for fast and slow pain.	1016	— D08(RS2)
2. Describe the neural mechanism of pain. Add a note on acupuncture analgesia.	1016	902 J06
3. Visceral pain.	1018	903 D98
4. Define 'referred pain'. Give any two examples of referred pain. Explain its physiological basis.	1019	904 J07(RS2), J10(RS2), J98, J00, J07, J12, J13, J15
5. Endogenous pain inhibiting system and its role.	1020	904 D07(RS2), J01, J02, D02, D04, J09
Short Answers		
1. Physiological basis of use of a drug in relieving inflammatory pain.	—	D08(RS2)
2. Briefly describe the differences between fast and slow pain.	—	D05
3. List four special features of visceral pain.	1018	903 D16
4. Referred pain.	1019	904 J06
5. Describe the mechanism of referred pain.	1019	904 J10
6. Dermatomal theory of referred pain.	1019	904 D07(RS2)
7. Name the endogenous opioid peptides. Mention their role.	1021	906 J13

CHAPTER 121: TRIGEMINAL SYSTEM

None

CHAPTER 122: THALAMUS**Long Essay**

1. Describe the nuclei, connections and functions of the thalamus with suitable diagrams. Add a note on phantom limb.

Short Essays

1. Describe the functions of thalamus. Add a note on thalamic syndrome.

2. Thalamic syndrome.

1031 983 J06(RS2), J18(RS3), D16, J14(RS3)

Short Answer

1. List the features of thalamic syndrome.

1031 983 D15(RS3), D18(RS3)

CHAPTER 123: SENSORY CORTEX**Short Essays**

1. Explain the location and functions of somatosensory area of cerebral cortex.

2. Somatosensory area I.

1034 899 D14(RS3)

Short Answer

1. Mention the features of representation of the body in the sensory cortex (sensory homunculus).

CHAPTER 124: SENSORY ABNORMALITIES**Short Essay**

1. Brown-Séquard syndrome.

1038 938 J09(RS2), D06, J11

Short Answers

1. Brown-Séquard syndrome—clinical features below the level of lesion.

1038 938 D14(RS3), J18(RS3)

2. Syringomyelia.

1038 940 J06

CHAPTER 125: INTRODUCTION TO ORGANIZATION OF MOTOR SYSTEM

None

CHAPTER 126: SEGMENTAL ORGANIZATION OF MOTOR SYSTEM

None

Contd...

GKPAL AKJN

CHAPTER 127: MUSCLE SPINDLE AND GOLGI TENDON ORGAN

Long Essays

1. Draw a neat labeled diagram of the muscle spindle. Explain how muscle tone is maintained in the body. 1049 882 D09(RS2), J13(RS3)

2. What are the components of a mono-synaptic reflex? Explain the role of muscle spindle in the regulation of muscle length. 1050 881 D05

Short Essay

1. Describe the structure of muscle spindle and its functions. 1048 881 J10(RS2), D16(RS3), D01

Short Answers

1. Muscle spindle. 1048 881 D10(RS2)

2. Draw and label structure and innervation of muscle spindle. 1049 882 D06(RS2), D08

3. Draw and label Golgi tendon organ. What are its functions? 1052 886 D09, J14

CHAPTER 128: SPINAL REFLEXES

Long Essays

1. Give the clinical classification of reflexes. Give examples for each. Draw a labeled diagram of spinal reflex arc. Explain how reflexes are useful in clinical examination. 1055 880 D03

2. Define reflex action. Give different types of classifications of reflexes. Describe four important properties of reflexes. 1059 880 D11

Short Essays

1. Draw the reflex arc for knee jerk. Explain the basis of: (a) Exaggerated knee jerk and (b) Loss of knee jerk. — D00

2. Importance of clinical testing of muscle tone. — 885 D12(RS3)

3. Reciprocal innervation (neural circuit) and its functional importance. — 886 J01, J15

4. Describe the properties of polysynaptic reflexes. — 887 J05

5. Give the neural circuits for crossed extensor reflex, explain its functional importance. — 887 J03

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GKPAL AKJN

6. How is crossed extensor reflex elicited? — Draw a diagram of its neural circuit and mention its purpose. 888 D15

7. Name the superficial reflexes. What are the physiological conditions in which Babinski's sign is positive? 919 D07

8. Stretch reflex. 1054 881 J07(RS2), J09(RS2), J15

9. Draw a diagram of reflex arc and classify reflexes. 1055 880 J11

10. Describe withdrawal reflex with a diagram and give its significance. 1057 887 J08(RS2)

11. Define muscle tone. Explain reflex regulation of muscle tone. 1057 883 J08

12. Define muscle tone. Explain its physiological basis. What is its clinical importance? 1057 885 D99, D00

13. Explain the effect of lesion of a: (a) Dorsal nerve root, (b) Upper motor neuron on muscle tone. 1057 885 D17(RS3)*

Short Answers

1. Three differences between superficial and deep reflexes. — J15(RS3)

2. Draw the reflex arc for patellar tendon reflex. — J04, J06

3. Draw the reflex arc for knee jerk. — D05(RS2)

4. Explain reciprocal innervations. — 886 D08

5. What lesions produce patellar clonus and ankle clonus? — 887 D07

6. Draw the neural circuit for crossed extensor reflex. — 888 D13

7. Draw and label a muscle stretch reflex arc. 1055 881 D12

8. Inverse stretch reflex—describe, name the receptors, physiological basis, significance. 1056 886 J17(RS3), J05, J13

9. Explain what is withdrawal reflex. 1057 887 D10

10. Define muscle tone. What is its clinical importance? 1057 885 J00

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GKPAL AKJN

CHAPTER 129: DESCENDING PATHWAYS**Long Essay**

1. Describe the origin, course, termination and function of corticospinal tract (pyramidal tract) with labeled diagrams. Describe the role of corticospinal pathways in control of posture and movement. List the effects of lesion of the tract in right internal capsule. What is hemiplegia and paraplegia? List the features of hemiplegia.

Short Essays

1. Difference between upper motor neuron and lower motor neuron. — J99, J01
2. Describe the functions of extrapyramidal tracts. 917 D11
3. (Compare and contrast) Tabulate differences between pyramidal and extra pyramidal systems. 918 D09(RS2), J13(RS3) *
4. Pyramidal tract 1062 913 J18(RS3)
5. Describe the course of corticospinal tract. 1062 913 J10
6. Trace the pathway of rubrospinal tract and write its function. 1065 917 D07
7. In a tabular column compare the features of upper motor neuron lesions and lower motor neuron lesions. 1068 919 D06(RS2), J11(RS2), J16(RS3), J17(RS3)

Short Answers

1. Babinski sign—causes, significance. — 919 J06(RS2), D11(RS3) *, J12(RS3), J18(RS3), J98, D01, D04, J10, J12
2. Upper motor neuron. 1062 — D98
3. Mention four features of lesion to cortico-spinal fibers at right internal capsule level. 1064 917 J13
4. List the signs of the upper motor neuron lesion. 1064 919 D14(RS3) *, J00, D02, D11, J15
5. What is hemiplegia and involvement of which motor tract leads to hemiplegia? 1069 917 D07

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GKPAL AKJN

CHAPTER 130: REGULATION OF POSTURE AND MOVEMENT**Long Essays**

1. Describe the role of spinal cord and medulla in the control of movement and posture. 1072, 1074 952 D08(RS2)
2. Describe the immediate effects of complete transection of the spinal cord at midthoracic level and explain the basis of these effects. 1072 935 D06(RS2)
3. Describe the neurological changes that are seen four weeks after complete transection of the spinal cord at L-1 level. 1073 936 D05(RS2)

Short Essays

1. Explain with the help of a diagram, sensory and motor changes in a hemisection of spinal cord. 938 D00, J03, D08, D15
2. Tabulate the differences between classical decerebration and ischemic decerebration. 957 D09(RS2) *, J13(RS3)
3. Complete transaction of the spinal cord. 1072 935 J17(RS3)
4. Stages and features of spinal shock. 1072 935 D16(RS3)
5. Describe the mass reflex and its basis. 1073 937 D05
6. Site of lesion and reflexes present in decerebrate cat. 1074 954 J06(RS2)
7. Decerebrate rigidity—features and physiological basis/mechanism. 1074 954 D14(RS3), J12, D14
8. Describe the righting reflexes, their significance and neural level of integration. 1077 957 D15

Short Answers

1. Describe the immediate effects of spinal transection. 1072 935 D05
2. Spinal shock and its features. 1072 935 J02, D06
3. Explains mass reflex and its basis. 1073 937 D06(RS2), J08(RS2), J04
4. Decorticate rigidity. 1078 958 J08(RS2)
5. Describe the functions and the features of primary motor area. 1079 911 J09

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	GKPAL	AKJN	
6. Describe the representation on motor homunculus.	1079	912	J05(RS2), D17(RS3), J04

CHAPTER 131: BASAL GANGLIA

Long Essay

1. Describe the nuclei, connections and functions of the basal ganglia. Mention the features of basal ganglia lesion. Add a note on its disorders Parkinson's disease (pathophysiology, clinical features, physiological principles of treatment).	1082	995, 999	J10(RS2), J18(RS3), D18(RS3), J98, J01, J02, D04, D06, D12, D16
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Short Essays

1. Enumerate the structures that form basal ganglia. Describe their functions.	1082	995	J11(RS2), D07
2. Nigrostriatal pathway.	1083	996	D12(RS3), J05(RS2)
3. List four features of basal ganglia disease and explain the basis of any one.	1085	999	
4. Write a short essay on Parkinsonism (cause, clinical features and treatment).	1085	999	J09(RS2), D15(RS3), D01
5. Describe the features and physiological basis of Parkinsonism.	1085	999	D13

Short Answers

1. Differentiate between lead pipe rigidity and cog-wheel rigidity.	—	—	J10
2. Paralysis agitans (Parkinsonism) and its features.	1085	999	D98, J99, D99, J07
3. Explain what is 'lead-pipe' and 'clasp-knife' rigidity in what pathological conditions are they found.	1086	1000	D10
4. Chorea.	1087	1002	J07(RS2)

CHAPTER 132: CEREBELLUM

Long Essays

1. Name the functional divisions of the cerebellum. Describe the structure, connections and functions of cerebellum. Mention two signs of cerebellar lesions.	1089	966, 974	J15(RS3), J99, J00, D02, J08
2. Describe the input, output, internal connections and functions of cerebellum. Add a note on clinical features seen in cerebellar dysfunction.	1091	967, 974	D14(RS3), D14, J15

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	GKPAL	AKJN	
3. Discuss how cerebellum controls motor activity. Add a note on tests of cerebellar function.	1094, 1096	972, 975	J13

4. List the features of cerebellar disorder.	1095	974, 972	D07(RS2)
Describe the role of cerebellum in the control of motor functions.	1094		

Short Essays

1. Functions of spinocerebellum.	1089	966	D08(RS2)
2. Name cerebellar nuclei. How is dentate nucleus connected to motor area of cerebral cortex?	1089	971	D07
3. Describe briefly important connections and functions of neocerebellum (cerebro-cerebellum).	1090	969	D13(RS3)
4. Functions of cerebellum.	1093	972	D15(RS3)
5. Explain the role of cerebellum in co-ordination of movements.	1094	972	D10
6. Define muscle tone. Describe supraspinal control of muscle tone.	1094	884	J04
7. List four features of cerebellar disorders and explain any one.	1095	974	D05(RS2)
8. Describe the characteristic features of cerebellar lesion.	1095	974	J12(RS3), D17(RS3), D09, J14

Short Answers

1. Explain the functions of flocculonodular lobe.	1089	966	D08
2. Draw the main connections of neo-cerebellum with cerebral cortex.	1092	970	J16(RS3)
3. Alpha-gamma colinkage.	1094	883	D08(RS2)
4. Name four features of cerebellar lesions.	1095	974	D03
5. Adiachokinesia.	1095	975	J98

CHAPTER 133: VESTIBULAR APPARATUS

Short Essays

1. Vestibular apparatus and its functions.	1097	943	J08(RS2), D98, J03
2. Write briefly on otolith organs.	1098	943	D10(RS2), D13
3. Name the receptors and functions of semicircular canals.	1099	946	D17(RS3), D18(RS3)

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GKPAL AKJN

Short Answers

1. Enumerate any three functions of vestibular apparatus. 1097
2. Otolith organs. 1098
3. Enumerate the functions of semicircular canals, utricle and saccule. 1098
4. Post-rotatory nystagmus. 1102
5. What is vestibulo-ocular reflex? 1102

CHAPTER 134: FUNCTIONS OF HYPOTHALAMUS

Long Essays

1. Describe the various nuclei and functions of hypothalamus. Describe the regulation of food and water intake (role of hypothalamus in the perception of hunger and thirst). 1104
2. Describe the principal connections and functions of hypothalamus. 1105
3. Describe any four functions of hypothalamus. Add a note on anorexia nervosa and hypothalamic obesity. 1106

Short Essays

Describe the functions of hypothalamus. 1106

1. Enumerate the functions of hypothalamus. 1106 Describe functions of hypothalamus/in the regulation of: (a) Food intake and (b) Water intake.
2. Explain the role of hypothalamus as an endocrine organ. 1106
3. Explain how hypothalamus controls secretion of pituitary gland (mode of hypothalamic regulation of pituitary hormones). 1106
4. Describe the role of hypothalamus in regulation of temperature. 1107
5. Role of hypothalamus in regulation of food intake. 1107
6. Regulation of water balance by hypothalamus. 1110

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GKPAL AKJN

Short Answers

1. List any four functions of hypothalamus. 1106
2. Name two areas in hypothalamus which control body temperature. 1107
3. Role of hypothalamus in hunger. 1107
4. Name the centers that regulate feeding behavior. 1107
5. Circadian rhythm. 1107
6. What are the locations of osmoreceptors and their functions? 1110

CHAPTER 135: PHYSIOLOGY OF RETICULAR ACTIVATING SYSTEM**Long Essays**

1. Describe the nuclei and functions of reticular formation. 1112
2. Explain the organization and functions of ascending reticular activating system of brain. 1114

Short Essay

1. Describe the functions of reticular activating system. 1112

Short Answer

1. Ascending reticular activating system. 1114

CHAPTER 136: ELECTROENCEPHALogram AND SLEEP**Short Essays**

What is EEG? Discuss the neuro-physiologic basis of EEG? What are its normal waves? What is alpha block? List the changes in EEG during different stages of sleep? 1115

2. Define sleep. Describe the genesis of NREM sleep. 1116
3. What are the stages of sleep? Write a brief note on REM sleep (mechanisms and features). 1117
4. Stages of slow wave sleep. 1117
5. Compare REM and non REM sleep. 1119

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Contd...	GKPAL	AKJN	
Short Answers			
1. Electroencephalogram (EEG). 1115	985	J18(RS3)	
2. Describe the various types of rhythms that make up the electroencephalogram. 1116	985	D10	
3. Write a brief note on alpha block. 1116	986	J07(RS2), D05	
4. Define sleep. Explain the characteristic features of REM sleep. 1116	988	J98, J08	
5. Explain the features of nonrapid eye movement (NREM) sleep. 1117	988	J12	
6. EEG changes in non-REM sleep. 1117	989	J14(RS3)	
7. Changes during slow wave sleep. 1117	989	D14(RS3)	
8. Differences between REM and NREM (slow wave) sleep. 1119	—	D15(RS3), D03, D12	
9. Paradoxical sleep. 1119	989	J10(RS2)	
10. Sleep disorders. 1122	992	D98	

■ CHAPTER 137: LIMBIC SYSTEM

Short Essays	GKPAL	AKJN	
1. Limbic system—components and functions. 1125	1028	J15(RS3), J99, D06	
2. Motivation and addiction. 1129	1031	J08(RS2)	
3. List the features of 'Klüver-Bucy syndrome'. 1133	1025	D13(RS3)	

Short Answers

1. List the functions of limbic system. 1129	1028	J00, D02, J03
2. Mention the effects of bilateral temporal lobectomy. 1133	1025	J12
3. Describe Klüver-Bucy animal. 1133	1025	D11, D14

■ CHAPTER 138: PHYSIOLOGY OF LEARNING AND MEMORY

Short Essays	GKPAL	AKJN	
1. Define learning. Explain the role of conditioned reflex in learning. 1134	1039	D09, J14	
2. Give classification of memory. Describe the mechanism of habituation. 1135	1041	J10	
3. What is conditioned reflex and unconditioned reflex? Explain with an example. 1136	1039	D00, J03	
4. Describe the molecular mechanisms of learning and memory. 1137	1039, 1042	D16	

Contd... —

Contd...	GKPAL	AKJN	
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Short Answers	GKPAL	AKJN	
1. Habituation and sensitization. 1135	889	J06(RS2)	
2. Types (classification) of memory with examples of each. 1135	1041	J05	

■ CHAPTER 139: PHYSIOLOGY OF LANGUAGE AND SPEECH

Short Essays	GKPAL	AKJN	
1. Name the language areas of cerebral cortex. Mention their location and explain their specific role. Give the features of lesion to these areas. 1143	1037	J13, D13	
2. Describe the mechanism of speech. 1144	1037	D10	
3. Discuss the role of Wernicke's area in production of speech. 1144	1037	J09	
4. How the speech of a person is affected with a lesion in 'Wernicke's area'. 1145	1038	D17(RS3)	

Short Answers	GKPAL	AKJN	
1. Dyslexia. — —	—	J08(RS2)	
2. Discuss the functions of angular gyrus. 1144	—	D10	
3. Broca's area and mention its role in speech. 1144	1037	D11(RS3), D98, J99	
4. What is aphasia ? What are the types? 1144 Name the center for speech. — —	1038	J11(RS2), J12(RS3), D01, J03, D04, D07, D11	

■ CHAPTER 140: ASSOCIATION CORTEX, CEREBRAL ASYMMETRY, LOBES OF THE BRAIN, AND CORTICAL PLASTICITY

Short Essays	GKPAL	AKJN	
1. Concept of cerebral dominance (categorization of hemisphere). 1149	1035	D07(RS2)	
2. Mention the various Brodmann's numbers in the frontal lobe. Describe briefly each one. 1152	—	J06	
3. Functions of prefrontal lobe. 1152	1023	D10(RS2), D13(RS3)	
4. What is frontal lobe syndrome and its behavioral effects? 1153	1024	D11(RS3)	

Short Answers	GKPAL	AKJN	
1. Functions of parietal lobe of the brain. 1151	1021	D08(RS2)	

Contd...	GKPAL	AKJN
2. Functions of prefrontal lobe.	1152	1023
3. Mention two effects of prefrontal lobotomy.	1153	1024 D12

CHAPTER 141: CEREBROSPINAL FLUID

Long Essay

1. Describe the mechanism of secretion, circulation and functions of cerebrospinal fluid.	1156	373	D10(RS2), J10
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Short Essay

1. Describe formation, circulation and function of cerebrospinal fluid (CSF). Add a note on hydrocephalus.	1156	373	J18(RS3), D15
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Short Answers

1. Cerebrospinal fluid and its functions.	1154	372	J09(RS2), J15(RS3), J02, J04, J05
2. Mention the site of production, drainage and method of collection of cerebrospinal fluid (CSF).	1156	373	J13
3. Lumbar puncture (sites and uses).	1158	374	J99, D03
4. Explain blood-brain barrier in cerebral circulation.	1160	375	J09

Section 12: SPECIAL SENSES

CHAPTER 142: FUNCTIONAL ANATOMY OF EYE

Long Essay

1. Describe the formation, circulation, drainage and functions of aqueous humor. What is glaucoma?	1168	1090	J03
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Short Essays

1. Draw a diagram to show the different refractive media of the eye and explain their role in the dioptric power of the eye.	—	1090	D05(RS2)
2. Describe the sources, circulation, drainage and functions of aqueous humor. Draw a diagram to show the circulation of aqueous humor. Give the significance of regulation of intraocular pressure.	1168	—	J05(RS2), D14(RS3), J17(RS3), D99, J04
3. Importance of maintaining normal intraocular pressure.	1171	—	D17(RS3)

Contd... —

Contd...

Short Answers	GKPAL	AKJN
1. Describe the mechanism of constriction and dilation of pupil.	1167	—
2. Name the intraocular muscles, with their functions.	1168	1088 D99
3. Functions, circulation, absorption of aqueous humor and its applied aspect.	1168	1090 J15(RS3), J99, J02, J08, J15, D15
4. Glaucoma.	1168	1090 D12(RS3)
5. What is fovea centralis and why it has highest visual acuity?	1170	1089 D15, D16
6. Importance of fovea centralis.	1170	1090 J15
7. Amacrine and horizontal cells.	1170	1092 D09(RS2), J13(RS3)
8. What is the normal intraocular pressure? What is the clinical importance?	1171	— J11(RS2), D01, D02, D04
9. What is the location and cause for physiological blind spot in visual field.	1171	1089 D01, D04, J08
10. What is the normal intraocular pressure? How is it measured? Define glaucoma.	1171	1090 D11(RS3)

CHAPTER 143: IMAGE-FORMING MECHANISM

Short Essays

1. Describe the errors of refraction and their correction.	1175	1105 D07(RS2), D10(RS2), J11(RS2), J12(RS3), J14(RS3), D18(RS3), D01, J08, D11
2. Draw diagram to show the formation of images in hypermetropia, myopia and astigmatism. Explain its correction.	1175	1105 D06(RS2), D03
Short Answers		
1. What are Purkinje-Samson images? What do they demonstrate?	—	1100 J00, J01
2. Accommodation in eye.	1174	1100 J06(RS2)
3. Changes during accommodation for near vision (components of near response).	1174	1102 J12(RS3), D05, D07
4. Define near point. Give its clinical significance.	1174	1103 D14(RS3)

Contd... —

Contd...	GKPAL	AKJN
5. Myopia.	1175	1105
6. Hypermetropia—Image formation and its correction (with help of a diaphragm).	1175	1105
7. Depict by means of sketches refractory errors in myopia and hypermetropia and their correction.	1175	1105
8. What is astigmatism? Explain the basic defect in astigmatism. How is it corrected?	1175	1106
9. Presbiopia and its correction.	1176	1105

CHAPTER 144: PHOTORECEPTOR MECHANISM

Short Essays

1. Distinguish between the functions of rods and cones. Explain how rhodopsin—retinene cycle.
2. Visual pigments.
3. Describe the sequence of events in the photoreceptors when light strikes them.
4. Describe the sequence of events in phototransduction in rods and cones.
5. Describe the genesis of photoreceptor potential in rods.
6. Explain the ionic basis of photoreceptor potentials.

Short Answers

1. Differentiate rods from cones.
2. What is scotopic and photopic vision? What is Purkinje phenomenon?
3. Name the retinal receptors of vision (visual receptors). What are their functions?
4. Name functions of rods and cones.
5. Draw flowchart of rhodopsin—retinal visual cycle.

CHAPTER 145: VISUAL PATHWAY AND VISUAL CORTEX

Long Essay

1. Describe the optic pathway. What are the effects of lesions at various levels of the optic pathway?

Contd... —

Contd...

Contd...	GKPAL	AKJN
Short Essays		
1. Describe visual pathway with a labeled diagram. Describe the effects of lesions at various levels in the pathway.	1181	1093, 1097
2. Draw a labeled diagram of the visual pathway. Name the field defect produced by cutting the left optic tract and indicate it on a diagram.	1182	1094, 1097
3. Draw the visual pathway. Explain homonymous hemianopia and macular sparing.	1182	1094, 1096
4. Name the different visual field defects caused by lesions to visual pathway. Give the basis of each defect. What is 'macular sparing'?	1182	1097

Short Answers

1. What is homonymous hemianopia? Mention the lesions in the visual pathways that produce it.
2. Bitemporal hemianopia.
3. Macular sparing.
4. Draw a visual pathway.
5. What is the effect of lesion in visual pathway at the level of optic chiasma?

CHAPTER 146: VISUAL ACUITY, VISUAL FIELD, LIGHT AND DARK ADAPTATIONS, AND VISUAL REFLEXES

Long Essay

1. Describe the pupillary reflexes and their pathways. Add a note on Argyll-Robertson pupil.

Short Essays

1. What is meant by visual acuity? What are the factors that influence visual acuity? Explain the physiological basis of testing visual acuity.
2. Describe the mechanism of light and dark adaptation.

Contd... —

Contd...

	GKPAL	AKJN	
3. Dark adaptation—explain with help of a diagram, time course and changes occurring, factors contributing.	1191	1109	D06(RS2), J10(RS2), J17(RS3), D00, J02, D04, J05, J09
4. Dark adaptation and nyctalopia.	1191	1109, 1110	J16(RS3)
5. Light and accommodation reflexes (pupillary reflex).	1191	1100	J09(RS2)
6. Explain pupillary light reflex. Describe the pathways involved in it.	1191	1100	D10
7. Draw the pathway for 'indirect light reflex'.	1192	1102	D13(RS3)
8. Draw a diagram to show the pathways for light reflexes (no explanation needed).	1192	1102	D06(RS2), D05
9. Accommodation reflex—trace the pathway and explain the changes occurring during accommodation. What is Argyll-Robertson's pupil?	1192	1103	D09(RS2), J13(RS3), J17(RS3), J01, J07
10. Describe the mechanism of accommodation. Draw and label accommodation pathway (near response).	1174, 1192	1102	J15(RS3), J04

Short Answers

1. Define: (a) Visual acuity and (b) Accommodation
2. Visual acuity—define, basis, expression.
3. What is field of vision? What are the limits of field of vision in different meridians?
4. Describe the dark and light adaptation.
5. Dark adaptation—physiological basis, three mechanism involved, dark adaption curve, related disorder.
6. What is nyctalopia? Give its physiological basis.
7. Accommodation reflex (near response of eye).
8. What is Argyll-Robertson's pupil? Name site of lesion producing it.

CHAPTER 147: COLOR VISION**Long Essay**

1. What are the mechanisms to perceive color vision (theories of color vision)? Add a note on color blindness (classification and tests).

Contd... —

Contd...

	GKPAL	AKJN	
Short Essays			
1. Color vision.			
2. Theories of color vision (Mechanisms of color vision).	1194	1114	J98
3. Describe the Young-Helmholtz theory of color vision.	1194	1115	D08(RS2), D16
4. Describe color blindness.	1195	1115	D10
5. Define and classify color blindness. What is the peculiarity of inheritance of color blindness?	1195	1115	J12(RS3), D15(RS3) J00, J02, D04

Short Answers

1. Explain primary and complementary colors.
2. Explain briefly trichromatic theory of color vision?
3. Color blindness.

CHAPTER 148: MOVEMENTS OF THE EYE**Short Answers**

1. Strabismus.
2. Describe the innervation and movements of extraocular muscles.
3. Mechanism of depth perception of object by the eyes.

CHAPTER 149: FUNCTIONAL ANATOMY AND FUNCTIONS OF THE EAR**Short Essays**

1. Attenuation reflex.
2. Describe the structure, contents and functions of middle ear. Explain the tympanic reflex (impedance matching).
3. Describe briefly the functions of middle ear.

Contd... —

Contd...	GKPAL	AKJN	
4. What are types of deafness? Give an example for each.	1217	1081	D14
5. Conduction deafness.	1217	1081	D98
6. Rinne's test and its interpretation.	1218	1083	D07(RS2), J01
7. Explain Weber's test and its application.	1218	1083	D00, D01, D04, D10
8. What is meant by audiometry?	1219	1082	J03, J12, D12

CHAPTER 153: PHYSIOLOGY OF SMELL

Short Essays

1. Primary sensation of smell.	—	—	J07
2. Neural pathway and the physiological role of olfaction.	1221	1058	D13(RS3)
3. Describe with the help of a diagram, the olfactory pathway (pathway for smell). Explain the term adaptation in relation to olfaction.	1221	1058	J09(RS2), D02, D03, J12
Short Answers			
1. Name any two special features of olfactory sensation.	1220	1061	D15
2. Mention the location of olfactory receptors. What is olfactory adaptation?	1221	1058	J13
3. Olfactory bulb.	1221	1058	J98
4. Draw and label basic neural circuits in olfactory bulb.	1221	1058	D08
5. Name the cortical olfactory areas.	1221	1059	D14(RS3)
6. Draw and label olfactory pathway.	1222	1058	J11(RS2), J14(RS3), J15
7. List the factors affecting olfaction.	1223	—	D16
8. What are anosmia and hyposmia? Mention any common cause.	1223	1061	D15

CHAPTER 154: PHYSIOLOGY OF TASTE

Short Essays

1. Describe the structure of taste bud, the location of taste buds and the taste pathway.	1224	1063	D11(RS3)
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Contd... —

Contd...	GKPAL	AKJN	
2. Describe the taste pathways and mechanism of taste perception.	1225	1064	D12(RS3), J15(RS3), J00, D00, J03, D06, J09, D11, D14
3. Taste pathway and taste disorders.	1225	1064	D18(RS3)
4. Name the primary taste sensations. Give the role of chemical senses in humans.	1225	1065	J04
5. Draw a diagram to show the taste pathway from the anterior two-thirds of the tongue.	1226	1064	D05(RS2)
6. Mention the basic modalities of taste sensation and their representation on the tongue. Describe a taste bud.	1226	1065	D01
Short Answers			
1. Taste buds.	1224	1063	J10(RS2), J18(RS3), J99
2. Mention the nerve supply of the tongue which carries the general sensations and taste sensations from different areas of the tongue.	1225	1064	D02
3. Name basic taste sensations. On what part of the tongue they are perceived.	1225	1065	J10
4. Name the primary taste sensation. Explain the mechanism of perception of any one taste sensation.	1225	1065	D17(RS3)
5. Name the primary taste sensations. What is aguesia.	1225	1065	J11(RS2), D14(RS3), D12
6. Draw taste pathway from anterior 2/3rd of tongue to the cortex.	1226	1064	J16(RS3)
7. Draw a labeled diagram of pathways for taste.	1226	1064	D10(RS2), D15(RS3), D99, J02, J03, D10
8. What is aguesia? Trace the pathway of taste upto the taste center?	1228	1067	D07

Contd... —

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GKPAL

AKJN

Section 13: INTEGRATIVE PHYSIOLOGY

CHAPTER 155: STRUCTURE AND FUNCTIONS OF THE SKIN

Short Essay

1. Explain briefly the role of skin in regulation of body temperature. 1236 590 D10(RS2), J15

Short Answers

1. Draw and label the structure of skin. 1233 — J07
 2. Sweat gland. 1234 591 J09(RS2), D10(RS2)
 3. Name the different types of sweat glands and give the stimulus for each. 1234 591 D03
 4. Eccrine sweat glands—distribution and functions. 1234 591 D17(RS3), D08
 5. Functions of skin. 1236 — J12(RS3), D14(RS3), D98, D99, D02, J03, D06, D09, J11, J13, D13, J14, D14
 6. What are the secretory and synthetic functions of skin? 1236 — D11(RS3)
 7. Describe the functions of skin in regulation of body temperature. 1236 590 D11

CHAPTER 156: REGULATION OF BODY TEMPERATURE AND ACCLIMATIZATION TO HOT AND COLD ENVIRONMENTS

Short Essays

1. How much is normal body temperature and explain the various heat gain mechanisms. 1238, 1240 587, 588 J11
 2. What is core and shell temperature? Explain heat loss mechanisms. 1238, 1241 587 J15(RS3)
 3. Regulation of body temperature. 1240 591 J18(RS3)
 4. Explain the heat loss mechanisms to maintain constant body temperature. 1241 590 J07(RS2), D07
 5. Role of conduction type of heat loss in treating heat stroke. 1245 590 J08(RS2)
 6. Mechanisms activated in body with exposure to heat. What is heat stroke? 1245 592 J14(RS3)
 7. Immediate cardiovascular changes on exposure to hot climate. 1245 592 D07(RS2)

Contd... —

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GKPAL

AKJN

8. How is body temperature defended when a person is exposed to very cold environment? 1246 591 J15

9. Body mechanisms activated with exposure to cold. 1246 591 J16(RS3)
 10. Cardiovascular changes on exposure to cold. 1248 591 D08(RS2)
 11. Hypothermia. 1251 594 J98, J99
 12. What is hypothermia and what is the clinical importance of induced hypothermia? 1251 594 D07

Short Answers

1. Role of horripilation. — 591 D03
 2. Explain how behavioral thermoregulation operates to maintain body temperature. — 591 J09
 3. What is normal body temperature? What is the role of skin in maintaining it. 1238, 1236 587 J01
 4. What is the normal body temperature? Enumerate the bodily reactions that tend to prevent a rise in body temperature. 1238, 1245 587, 590 J02
 5. What is the normal body temperature? What are the means of heat loss from the body? 1238, 1241 587, 590 D02
 6. Explain the factors affecting body temperature. 1238 588 J08
 7. What is the normal "core body temperature"? Mention the ways in which the body can gain heat. 1238, 1240 587 D01, D04
 8. Core and shell temperature. 1238 587 D10
 9. List the different modes of heat production in the body. 1240 588 D99
 10. Explain the heat loss mechanisms. 1241 590 D13(RS3), J17(RS3), J00, J03, J08
 11. Explain how sweating helps in temperature regulation. 1242 591 D05(RS2), J04, D06
 12. How does sweating help in regulating body temperature? Give the innervation of eccrine sweat glands. 1242 591 D12
 13. What is the role of epinephrine on thermogenesis? 1244 593 D16

Contd... —

	GKPAL	AKJN	
14. Name the hypothalamic centers that regulate body temperature. Mention the role of hypothalamus in causing fever.	1244	592	J13
15. Explain the mechanism of temperature regulation by anterior hypothalamus.	1244	592	D10
16. Explain the role of hypothalamus in thermoregulation in cold environment.	1244	591	J12
17. What are the physiologic thermoregulatory mechanisms activated by an increase in body temperature or exposure to heat?	1245	592	D01, D04, J05, D08
18. Brown fat—functions.	1246	589	J07(RS2), D15
19. Enumerate the thermoregulatory changes when a person is exposed to 20 degree centigrade.	1246	591	D13
20. How is body temperature defended when a person is exposed to very cold environment?	1246	591	D05, J10, D14
21. Explain the role of shivering in temperature regulation.	1246	591	J05(RS2)
22. Nonshivering thermogenesis.	1246	—	D12(RS3)
23. What is pyrexia? Explain the physiological basis of its genesis.	1248	593	J12
24. Describe pathogenesis and functions of fever.	1249	593	J10, D12
25. Endogenous pyrogens.	1249	594	D09(RS2), J13(RS3)
26. Heat stroke—explain (symptoms and treatment).	1250	—	J09, D09, J14
27. Describe the effects and use of hypothermia.	1251	594	D11

CHAPTER 157: PHYSIOLOGY OF EXERCISE AND SPORTS SCIENCE

Long Essay

1. Describe the cardiorespiratory adaptations to exercise.	1256, 1259	482	D09
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Short Essays

1. Describe the cardiovascular and respiratory adjustments during exercise.	1256	482	J06, J10
2. Explain the changes which occur in the respiratory system during muscular exercise.	1256	486	J05(RS2)
3. Describe the oxygen debt mechanism.	1256	487	D08

Contd... —

Contd...

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	GKPAL	AKJN	
4. Describe the cardiovascular changes during muscular exercise.	1259	482	J12(RS3)
5. Describe the circulatory changes during muscular exercise.	1260	484	J00, J01, D01, J04
6. Describe the effect of muscular exercise on coronary blood flow.	1261	366	D05

Short Answers

1. Oxygen debt.	1256	487	J06
2. Diagrammatically represent the ventilatory changes during exercise.	1257	486	J09(RS2)
3. Describe the effects of dynamic exercise on muscle blood flow.	1260	484	J07
4. Why do heart rate and rate of respiration increase during exercise?	1260, 1257	482, 486	J09

CHAPTER 158: PRINCIPLES OF ACID-BASE HOMEOSTASIS

Short Essays

1. Renal regulation of H ⁺ ion.	1268	557	J10(RS2)
2. Outline the role of kidneys in acid-base balance. Add a note on tubular buffers.	1268, 713	557	D12, D13
3. Enumerate the causes of metabolic acidosis. How is it corrected?	1269	569	D07
4. Renal compensation in respiratory acidosis.	1270	569	D05(RS2)

Short Answers

1. What is the pH value of arterial and venous blood? Name one physiological and one abnormal condition producing alkalosis.	1266	569	J07
2. Bicarbonate buffer system.	1267	566	D08(RS2)
3. Metabolic acidosis.	1269	571	J08(RS2)

CHAPTER 159: REGULATION OF VOLUME, COMPOSITION AND OSMOLALITY OF BODY FLUID COMPARTMENTS

None

CHAPTER 160: PHYSIOLOGY OF GROWTH AND DEVELOPMENT

Long Essays

1. Give a detailed account of physiology of growth and development in human beings.	1278	674	J98
2. Describe in detail endocrine regulation of growth.	1279	677	J04

Contd... —

Contd...	GKPAL	AKJN
Short Essay		
1. Describe the mechanism by which hormones regulate growth.	1279	D06
Short Answer		
1. What is Laron dwarfism and its causes?	1281	D15
CHAPTER 161: PHYSIOLOGY OF NUTRITION		
Short Essay		
1. Dietary fiber.	1283	636
Short Answers		
1. What is respiratory quotient and the effect of metabolism of various food stuffs on its value.	—	D11(RS3)
2. What is dietary fiber? What is its importance?	1283	D18(RS3), D08, D09
CHAPTER 162: PHYSIOLOGY OF AGING AND OXIDATIVE STRESS, PREVENTION OF AGING AND PHYSIOLOGY OF YOGA		
None		
MISCELLANEOUS		
Long Essay		
1. Discuss the hypothalamo-hypophyseal control of ovulation and spermatogenesis..	—	D06
Short Essays		
1. Define 'pitting edema'. Give its physiological basis.	—	J13
2. Explain the role of 'chemical senses' in humans.	—	J05(RS2)
3. Problems in prematurity.	—	J08(RS2)
4. Smell and taste are linked—explain.	—	D09(RS2), J13(RS3)
5. Reactive hyperemia.	—	J10(RS2)
Short Answers		
1. AS painal.	—	J06
2. Alkaline tide.	—	J08(RS2), D08(RS2)
3. Factors causing hypo-effective heart.	—	D08(RS2)
4. What is translocation blood and when is it taking place in a normal subject?	—	J09

Contd...—

Contd...	GKPAL	AKJN	
5. Physiological basis of use of a drug in the treatment of stroke.	—	—	D08(RS2)
6. Enumerate the types of RNA and explain their functions.	—	—	J11
7. What is reactive hyperemia? Where does it occur?	—	—	D10
8. Mention the methods of cell division with examples. Where it takes place?	—	—	D99
9. What is meant by mitosis and meiosis? Where does it take place?	—	—	J02
10. What is meant by translation and transcription process?	—	—	D01, J03, D04
11. What are the causes for latent period in simple muscle twitch?	—	—	D15
12. What is alveolar capillary block syndrome?	—	—	J09(RS2)
13. Enumerate the functions of medulla oblongata.	—	—	J08
14. Name some abnormal involuntary movements and the sites of lesion.	—	—	D15
15. In which conditions tremors are observed and how they are differentiated?	—	1000	D11(RS3)
16. Discuss papilledema.	—	375	J08(RS2)
17. Positive 'G'.	—	389	D08(RS2)
18. Carbon monoxide poisoning.	—	463	J13(RS3)
19. What is transferrin?	—	55, 272	J15
20. Name any two types of abnormal gaits. Mention the diseases associated with them.	1086, 1095	919, 975, 1001	D02

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BIOCHEMISTRY

REFERENCES

1. U. Satyanaran, U Chakrapani (**STNRN**): Biochemistry (5th Edition), Elsevier Health Sciences, New Delhi, ₹ 1365/-
2. DM Vasudevan, Sreekumari S, Kannan Vaidyanathan (**VSDN**): Textbook of Biochemistry (For Medical Students) (8th Edition), Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, ₹ 995/-

COURSE CONTENTS**THEORY**

- I. Introduction and scope of biochemistry
- II. Cell and subcellular structures
 - a. Cell membrane—composition
 - b. Functions of subcellular structures.
 - c. Transport across the cell membrane
 - i. Active transport
 - ii. Facilitated diffusion
 - iii. Receptor-mediated transport
 - iv. Endocytosis.
- III. Acid-base imbalance
 - a. Hydrogen ion concentration, acids, bases, buffers, Henderson-Hasselbach equation.
- IV. Isotopes, radioactive isotopes and their application in medicine
- V. Chemistry of carbohydrates
 - a. Definition, classification and biological importance.
 - b. Monosaccharides: Structure, classification and properties—Isomerism
 - c. Stereoisomerism
 - d. Oligosaccharides: Disaccharides—structure and their importance.
 - e. Polysaccharides: Homo- and heteropolysaccharides—structure and their functions.
- VI. Chemistry of proteins, amino acids and peptides
 - a. Proteins: Definition, classification and functions.
 - b. Amino acids: Classification, properties, side chains of amino acids, charge properties.
 - c. Peptides: Biologically important peptides—GSH, insulin and structure.
 - d. Structural organization, conformation and denaturation.
- VII. Chemistry of lipids
 - a. Definition, classification and biological importance.
 - b. Simple lipids: Triacylglycerol and waxes—structure and composition.
 - c. Compound lipids: Phospholipids, sphingolipids, glycolipids and their composition and function.
 - d. Derived lipids: Fatty acids—saturated and unsaturated and their properties, eicosanoids, terpenes.
- VIII. Chemistry of nucleic acids
 - a. Definition, biological importance.
 - b. Classification and composition.
 - c. Purine and pyrimidine bases, nucleosides, nucleotides and biologically important nucleotides.
 - d. DNA: Structure and functions.
 - e. RNA: Types of RNA—structure and functions.
- IX. Enzymes and clinical enzymology
 - a. Definition, classification, specificity, coenzymes, cofactors activators.
 - b. Mechanism of enzymes action.
 - c. Factors affecting enzymes activity— K_m value and its importance.

- d. Enzyme inhibition: Reversible and irreversible, competitive and other types, in clinical application.
- e. Regulatory enzymes: Proenzymes or zymogen, isoenzymes, allosteric enzymes and feedback control.
- f. Diagnostic and therapeutic importance of enzymes including enzyme immunoassay.
- g. ELISA and RIA.
- X. Vitamins
 - a. Definition and classification.
 - b. A brief account of chemistry, source, deficiency diseases and biochemical role, recommended dietary allowances (RDA).
 - c. Vitamin antagonists.
 - d. Hypervitaminosis.
 - e. A brief account of role of antioxidants and free radicals.
- XI. Biological oxidation
 - a. Mitochondria electron transport chain, oxidative phosphorylation, mechanism, uncouplers and inhibitors.
- XII. Digestion and absorption from gastrointestinal tract
 - a. Digestion and absorption of carbohydrates, lipids, proteins and nucleic acids.
 - b. Malabsorption syndromes.
- XIII. Carbohydrates metabolism
 - a. Glycogenesis, glycogenolysis and glycogen storage disease.
 - b. Glucose transporters, glycolysis, Rapoport-Luebering cycle, pyruvate oxidation, citric acid cycle.
 - c. Pentose phosphate pathway.
 - d. Uronic acid pathway.
 - e. Gluconeogenesis and Cori's cycle.
 - f. Metabolism of fructose and galactose.
 - g. Regulation of metabolic pathways.
 - h. Disorders of carbohydrates metabolism.
 - i. Regulation of blood sugar, glucose tolerance test, diagnostic and prognostic importance of glycated hemoglobin and diabetes mellitus.
- XIV. Lipid metabolism
 - a. Oxidation of fatty acids, propionate metabolism, formation and utilization of ketone bodies, ketosis, outline the synthesis of cholesterol (reactions up to mevalonate in detail), breakdown of cholesterol and metabolic disorders of lipids.
 - b. Lipogenesis, de novo synthesis of fatty acids, chain elongation, desaturation, phospholipid biosynthesis (lecithin and cephalin only) and their breakdown.
 - c. Fatty liver and lipotropic factors.
 - d. Prostaglandins and their biological functions.
 - e. Plasma lipoproteins—classification, functions and disorders.
- XV. Protein and amino acid metabolism
 - a. Breakdown of tissue proteins and amino acid pool, general reactions of amino acids.
 - b. Disposal of ammonia: Urea cycle, glutamate and glutamine formation.

- c. Metabolism of individual amino acids (glycine, serine, sulfur-containing amino acids, aromatic amino acids, histidine and arginine).
- d. Metabolic disorders of amino acids, aminoacidurias.
- e. Synthesis of creatine, phosphocreatine, formation of creatinine and clinical significance of creatinine clearance.
- XVI. Purine and pyrimidine metabolism
 - a. Source of various atoms of purine and pyrimidine, biosynthesis of purine and pyrimidine nucleotides and their breakdown.
 - b. Salvage pathways.
 - c. Disorders of purine and pyrimidine metabolism.
- XVII. Intermediary metabolism
 - a. Introduction, methods of study of intermediary metabolism.
- XVIII. Minerals
 - a. Calcium, phosphorous, sodium, potassium, chlorides, iron, copper, iodine, zinc, fluoride, magnesium, manganese and selenium.
- XIX. Molecular genetics and protein biosynthesis
 - a. DNA, RNA metabolism.
 - b. Replication, transcription, reverse transcription and post-transcriptional modifications.
 - c. Translation—amino acid activation, initiation, elongation and termination, post-translation modifications.
 - d. Regulation of gene expression.
 - e. Mutations.
 - f. Recombinant DNA technology, PCR and gene therapy.
- XX. Tissue biochemistry
 - a. Heme metabolism: Outline of heme biosynthesis, degradation of heme and functions of normal hemoglobin.
 - b. Abnormal hemoglobin.
 - c. Jaundice.
 - d. Porphyria.
 - e. Plasma proteins: Separation, functions and importance.
 - f. Immunoglobins: Structure and functions.
 - g. pH of blood, its regulation, acidosis, alkalosis, principles of estimation of body fluids, role of kidneys and lungs in blood pH maintenance.
- XXI. Liver functions and kidney functions
 - a. Liver function tests, kidney function tests.
 - b. Detoxification, mechanisms and metabolism of xenobiotics.
- XXII. Nutrition and energy metabolism
 - a. BMR and its importance.
 - b. Calorific values of food, RQ, SDA, balanced diet.
 - c. Protein energy malnutrition, biological value of proteins, nitrogen equilibrium.
 - d. Dietary fibers.
 - e. Biochemistry of starvation.
- XXIII. Biochemistry of cancer
 - a. Oncogenes.
 - b. Growth factors.

- c. Tumor markers
 - i. Definition
 - ii. Clinically important tumor markers—CEA, alpha fetoprotein (AFP).
 - iii. Human chorionic gonadotropins (hCG), calcitonin, prostate-specific antigen (PSA).
- XXIV. Endocrine function
 - a. Hormone actions: Mechanism of action of insulin, glucagon, epinephrine, steroids.
 - b. Thyroid function tests.
- XXV. Biochemical tests for atherosclerosis and myocardial infarction
 - a. Lipid profile, apoprotein, homocysteine and C-reactive protein.
 - b. CKMB, troponins.
- XXVI. SI units, quality control and standardization
 - a. Clinical chemistry: Interpretation and reference values of blood glucose, urea, creatinine, uric acid, cholesterol, calcium, proteins, albumin and A/G ratio.
 - b. Instrumentation including autoanalyzer.
- XXVII. Biomedical waste management
 - a. Types, potential risks and their safe management.

PRACTICALS

To be Done by the Students

Qualitative Analysis

- a. Reactions of monosaccharides—glucose and fructose.
- b. Reactions of disaccharides—lactose, maltose and sucrose.
- c. Reactions of polysaccharides—starch.
- d. Identification of unknown carbohydrates.
- e. Precipitation and coagulation reactions of protein.
- f. Color reactions of protein—albumin and casein.
- g. Identification of unknown proteins.
- h. Identification of substances of physiological importance.
- i. Normal constituents of urine.
- j. Organic: Urea, uric acid and creatinine.
- k. Inorganic: Ca, P, Cl, SO₄ and NH₃, specific gravity.
- l. Analysis of abnormal urine.
- m. Spectroscopic examination of hemoglobin derivatives and preparations of hemin crystals.
- n. Spot test for PKU, alkaptonuria and homocystinuria.
- o. Spotters.

Quantitative Estimation

- a. Estimation of blood glucose and interpretation.
- b. Estimation of blood urea and interpretation.
- c. Estimation of serum inorganic phosphorus and interpretation.
- d. Estimation of total serum proteins, serum albumin and A:G ratio.
- e. Estimation of urinary creatinine and interpretation of creatinine clearance.
- f. Interpretation of charts and case reports.

Demonstration Only

- a. Colorimetry.
- b. Paper chromatography.
- c. Paper electrophoresis.
- d. Glucose tolerance tests.
- e. Determination of AST (SGOT) and ALT (SGPT).
- f. Estimation of serum cholesterol (Kit method).
- g. Determination of ascorbic acid.
- h. Principle of flame photometry.
- i. Determination of glucose and proteins in CSF.
- j. Estimation of albumin in urine and tests for Bence Jones proteins in urine.

UNIVERSITY EXAMINATION PATTERNEligibility for Writing the University Examination

The candidate should have at least 35% aggregate in the two of the three internals conducted by the college and should also have minimum 75% attendance in Theory and Practical classes conducted.

Criteria for Passing the University Examination

- The candidate should secure minimum 50% in the university theory examination (University theory + Viva voce) and the university practical examinations separately.
- Candidate should also score 50% in Group A (University theory + Viva voce) and Group B (University Practical + Internal Assessment Theory and Practical)
- Class of passing would be determined from total of Group A + Group B. (Distinction—75% and above; First Class—65%–74.9%; Pass Class—50%–64.9%; Fail—<50%).

Distribution of Marks

	Internal assessment		University examination	
	Maximum marks	Minimum marks to qualify	Maximum marks	Minimum marks to pass
Theory examination	20 marks	7 marks	100 marks	60 marks
Viva voce	—	—	20 marks	—
Practical examination	20 marks	7 marks	40 marks	20 marks

Theory Examination

There shall be two papers of 50 marks each in a common question paper carrying 100 marks. The pattern of questions in each paper would be of three types.

1 Long Essay Questions	1 × 10 marks	10 marks
5 Short Essay Questions	5 × 5 marks	25 marks
5 Short Answer Questions	5 × 3 marks	15 marks
Total		50 marks

Distribution of Chapters in Paper I and II for University Examination with Weightage of Marks

Paper I	Marks	Paper II	Marks
Topics		Topics	
Cell structures and functions, subcellular organelles, cell membranes, transport across the membranes	6	Nucleotides and nucleic acid chemistry	5

Topics	Marks
Chemistry, digestion, absorption and metabolism of carbohydrates	10

Contd...

Biochemistry

Paper I	Marks	Paper II	Marks
Topics		Topics	
Chemistry, digestion, absorption and metabolism of lipids	10	Vitamins	10
Amino acids and protein chemistry, general reactions of amino acids, digestion and absorption, urea cycle and metabolism of amino acids	10	Minerals	10
Endocrine functions and biochemical tests	5		
Detoxification and xenobiotics	5	Molecular genetics, regulation of gene expression, recombinant DNA technology, PCR and gene therapy	5
Enzymes	10	Electrolyte and water balance, acid-base balance	10
Biological oxidation, integration of metabolism, TCA cycle and regulation of metabolism	10	Nutrition and energy metabolism	10
Free radicals and antioxidants	5	Heme metabolism, normal and abnormal hemoglobin, plasma proteins and immunoglobulins	10
Biochemistry of cancer, oncogenes and tumor markers	5	Liver function tests	5
		Kidney function tests	5
		Clinical chemistry, quality control, interpretation and reference values and analysis	5

Note:

- Marks allotted to each topic under each paper add up to more than 50 marks and they have been allotted marks only to signify the importance of the chapter.
- Long essays may be asked from topics carrying 10 marks but short essays and short answers can be asked from any of the topic.
- Topics assigned to the different papers are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics is inevitable and students are advised to be prepared to answer overlapping topics.

Practical Examination

Practical examination consists of two exercises of one-hour duration and 20 marks each.

Distribution of Practicals in Session I and II for University Examination with Marks

	Marks
Exercise I	
Quantitative estimation (every candidate shall perform one given procedure)	
a. Principle and procedure for the estimation asked in the question	5 marks
should be written by the candidate in first 5 minutes	
b. After collecting papers, correct procedure for the estimation is given and practical examination is done. Marks can be awarded for	10 marks
i. Results (values)	
ii. Calculations and reporting	
iii. Interpretation of results and application of estimate	
Discussion of case studies, graphs and charts (5 in number 1 mark each)	5 marks
Exercise II	
a. Qualitative analysis (every candidate shall perform one given procedure such as identification of carbohydrates, proteins, substance of physiological importance, analysis of normal urine, analysis of abnormal urine)	
i. For selection of appropriate reactions	5 marks
ii. For reasoning of analysis and correct reporting	5 marks
iii. For interpretation of results and application of estimation	5 marks
b. Five spotters, biochemical techniques—chromatography, electrophoresis, osazone preparation, biochemical tests and reagents	5 marks

Viva Voce

The viva voce examination shall carry 20 marks and all the examiners will conduct the viva examination separately for each candidate.

Question Bank

STNRN VSDN

Section 1: CHEMICAL CONSTITUENT OF LIFE**CHAPTER 1: BIOMOLECULES AND THE CELL****Short Essays**

1. Draw a neat diagram of a cell and its 5 organelles. Explain the functions of each.	10	D12(RS3)
2. Mitochondrial structure and important 6 functions.	12	D05
3. Lysosomes.	7	J07

Short Answers

1. Mitochondria.	6	12	J12(RS3)
2. Endoplasmic reticulum.	6	11	J10(RS2)
3. Give metabolic function of endoplasmic reticulum and mitochondria.	6	13	J07(RS2)
4. Lysosomes (metabolic functions and clinical significance).	7	12	D10(RS2), D16
5. Name subcellular organelles. Which are metabolic functions of cytosols?	8	13	J05(RS2)

CHAPTER 2: CARBOHYDRATES**Short Essays**

1. Function of carbohydrates.	9	88	D08(RS2)
2. Epimerization.	12	90	J11
3. Invert sugar.	19	95	J98
4. Polysaccharides.	20	96	J00
5. Describe the structure and biomedical importance of homopolysaccharides.	21	96	J02
6. What are mucopolysaccharides (glycosaminoglycans)? Give their biomedical importance with examples (name the functions and composition of four mucopolysaccharides).	23	98	D15(RS3), J16(RS3), J04, J12
7. Chondroitin sulfate.	25	98	J99, D04

Short Answers

1. Benedict's test and its importance.	—	92	J12
2. Compare and contrast starch and glycogen.	—	96	D15(RS3), J00
3. Epimerism and anomerism.	12	90	J14(RS3)

Contd... —

Contd...

	STNRN	VSDN
4. What are epimers? Give examples (name two epimers of alpha D-glucose).	12	90 D07
5. Mutarotation.	14	90 D06(RS2), J06
6. Detection of reducing sugar in urine.	16	92 J02
7. Glycosidic linkage.	18	95 J09
8. What is the clinical importance of glycosides?	18	93 D06
9. Invert sugar.	19	95 D14, D15
10. Milk sugar.	20	95 D00
11. Mention four homopolysaccharides.	21	96 D09
12. Amylose and amylopectins.	21	96 D00
13. Animal homopolysaccharide.	22	96 J98
14. Glycosaminoglycans.	23	98 J06(RS2), J08, J14
15. Heteropolysaccharides.	23	97 D98, D11
16. Give the composition of hyaluronic acid.	24	98 J13
17. Name mucopolysaccharides. Mention their functions.	25	98 J05(RS2)
18. Write the composition of any two heteropolysaccharides.	25	98 D12

■ CHAPTER 3: LIPIDS

Long Essay

1. Define lipids. Classify lipids with an example for each. Mention the functions of the lipids.

103 D12(RS3)

Short Essays

1. Classify of lipid with examples. What are essential fatty acids? Mention one function of each.

2. Compound lipids.

3. What are essential fatty acids? what are the functions of essential fatty acids?

4. Phospholipids—define, classify with examples, significance (functions), composition and functions of any two.

103, 242 D11

29 D98

242 D16(RS3)

108 D09(RS2), D01, D03, J04, J08, D10, J12

Short Answers

1. Unsaturated fatty acid (two examples).

2. Essential fatty acids and their importance.

30 104 D05, J09

32 242 D05(RS2), D15(RS3), J99, J00, D07, D08, D12, J14, J15

Contd... —

Contd...

	STNRN	VSDN
3. Triglycerides.	33	106 J98
4. Rancidity.	34	107 J08(RS2), J06
5. Lipid peroxidation—clinical importance.	34	241, 428 D07(RS2)
6. <u>Phospholipids</u> (name any two with their composition and functions).	35	108 D13(RS3), D06, J10, D12
7. Lecithin.	37	109 J99
8. Name the components of sphingomyelin.	37	110 D13
9. What are the components of ceramide? Name a phospholipid which contains ceramide.	37	110 J07
10. Surfactant—composition and function.	38	109 J02, J15
11. Gangliosides.	38	111 J98

■ CHAPTER 4: PROTEINS AND AMINO ACIDS

Long Essay

1. Classify amino acid based on their structure giving examples.

24 J14(RS3)

Short Essays

1. Essential amino acids.

2. Describe the decarboxylation reactions of amino acids with four examples. Give its significance.

3. Structural organization of proteins.

4. Define primary, secondary, tertiary and quaternary structure of protein. What are the noncovalent forces which preserve the secondary structure?

5. Secondary structure of proteins.

6. Give the salient features of α -helical structure and quaternary structure of proteins.

7. Describe the bonds that contribute to (stabilize) protein structure.

8. Classify proteins based on their function giving an example for each class.

9. Biologically active peptides (biological importance of peptides).

10. Glutathione.

50 27 D09(RS2), J11(RS2), J17(RS3)

53 29 J09, D12

55 36 D11(RS3)

59 38 J08(RS2), J07

59 39 D13

61 37 J98, D03

67 43 J13(RS3)

68 45 J08, D16

68 45 D99

Short Answers

1. Name two hydroxy amino acids.

2. Nutritional classification of amino acids.

49 24 J07

50 27 J10(RS2)

Contd... —

Contd...

	STNRN	VSDN	
3. Essential amino acids and their importance (functions).	50	27	J11(RS2), D98, J09, J03, J06, D09, D10,
4. Mention two/four nonprotein amino acids and their significance.	54	26	D03, J08
5. Peptide bond.	56	31	J10
6. Secondary structure of proteins.	59	38	D13(RS3), D10
7. Tertiary and quaternary structure of proteins.	61	39	D14(RS3)
8. Give brief account on quaternary structure of proteins.	61	39	J05(RS2)
9. Bonds stabilizing protein structure.	61	36	J15(RS3)
10. What is isoelectric pH? What is the application of isoelectric pH? State properties of a protein at its isoelectric pH.	64	28, 43	J07, D07, J13
11. Name two agents used to precipitate proteins.	64	43	J07
12. What is biuret reaction? What is its application?	65	46	J99, D01
13. Denaturation of proteins and factors causing denaturation.	65	44	J10(RS2), J15(RS3), D16(RS3), J99, J08, J11, D12
14. What is heat coagulation test? What is its clinical application?	66	44	J03
15. Functional classification of proteins.	67	43	D07(RS2)
16. What is complete protein?	68	45	D09(RS2)
17. Biologically active peptides and their functions.	68	45	J06(RS2), D06
18. Glutathione and its significance (role in erythrocytes).	68	45	D12(RS3), D16(RS3), D12

CHAPTER 5: NUCLEIC ACIDS AND NUCLEOTIDES

Long Essay

1. Draw neat diagram of Watson Crick model of DNA, explain its characteristics and the bonds that play a role in the stability of DNA structure.

Short Essays

1. Structure and function of DNA.
2. RNA—types, salient features and functions.

Contd... —

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	STNRN	VSDN	
3. Structure and functions of mRNA.	81	570	J11(RS2)
4. Structure and functions of tRNA. Mention the unusual bases present in it.	83	578	D13(RS3), J03, J18(RS3), J01, D06, D12
Short Answers			
1. Distinguish between RNA and DNA.	—	558	D05(RS2), J06, J12
2. Cyclic nucleotides.	—	544	J06(RS2), J11
3. Mention the functions of DNA.	72	558	J02
4. Which are biologically important nucleotides? Mention their functions.	73	—	J05(RS2), D05
5. Name four adenosine derivatives.	75	543	D01
6. Salient features of Chargaff's rule.	77	558	D10, D15
7. Salient features of Watson-Crick model of DNA.	77	557	D11
8. Base pairing rule and Wobble hypothesis.	78	558, 580	J13(RS3)
9. Base pairing rule and its importance.	78	558	D07(RS2), J14
10. Messenger RNA (mRNA)—structure and functions.	81	570	J98, J05, J08
11. Ribosomal RNA.	83	579	J15(RS3)
12. Draw a neat labeled diagram of tRNA.	83	578	D14(RS3)
13. Types of RNA and their function.	84	569	J07(RS2), D00, J09
14. What is the role of tRNA?	84	578	D09

CHAPTER 6: ENZYMES

Long Essays

1. What are enzymes? Classify enzymes with one example each. Explain any four factors that affect enzyme activity. Add a note on enzyme specificity.

2. Classify enzymes giving an example with the reaction catalyzed.

3. Explain the influence of various factors on enzyme activity.

4. Define the enzyme inhibition. Explain the features of competitive and non-competitive inhibition. Mention the therapeutic importance of competitive inhibition.

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	STNRN	VSDN	
5. Define isoenzymes. Mention the principles used for separation of isoenzymes. Write about the clinical importance of isoenzymes.	112	69, 78	D07(RS2)
Short Essays			
1. Define and classify enzymes (IUB classification) with one example for each class indicating the reaction catalyzed.	88	53	J18(RS3), J02, D09, J11, J12
2. Factors affecting enzyme action (reaction).	90	60	D06, D10
3. K_m value (Michaelis-Menten constant) of an enzyme and its significance with a suitable example.	90	61	D10(RS2), J12(RS3), J08
4. Effect of pH and temperature on enzyme catalyzed reaction.	91	62	J10
5. Describe the various type of enzyme inhibition giving suitable examples.	94	63	D18(RS3)
6. Explain competitive and noncompetitive inhibition. Mention significance of competitive inhibition.	94	63	J07(RS2)
7. Competitive inhibition—features, examples, importance in medicine (clinical use).	94	63	D08(RS2), J99, D02, D04, D07, D14
8. Noncompetitive enzyme inhibition.	96	64	J10(RS2)
9. Explain enzyme specificities with examples.	98	68	J12(RS3), J15
10. Coenzyme and their role in metabolism with four examples.	99	54	J07, J09
11. Describe the regulation of enzyme activity.	103	60	J04, J05
12. Allosteric enzymes.	103	66	J14(RS3), D99
13. Explain the mechanism of action of allosteric enzymes? Name the allosteric inhibitor and allosteric activator for phosphofructokinase and acetyl CoA—carboxylase.	103	66	D11(RS3)
14. Proenzymes.	105	63	D98
15. Therapeutic uses of enzymes.	108	84	J05(RS2)
16. Diagnostic importance of enzymes (enzymes in clinical diagnosis)—diagnostic enzymology.	110	78	J11(RS2), J08, D08, D12, D13

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	STNRN	VSDN	
17. How does estimation of enzymes in serum help in clinical diagnosis (clinical significance of serum enzyme estimation)? Illustrate with five examples.	110	78	J01
18. Name five enzymes of diagnostic significance. Give the normal serum level and one clinical condition associated with their increase.	110	78	D01
19. Isoenzymes and their clinical importance citing three examples.	112	69	D05(RS2), J16(RS3), J17(RS3), D17(RS3), D16 D15
20. What are isoenzymes? Discuss the isoenzyme forms of LDH.	112	69, 79	J03
21. What are isoenzymes? Name the isoenzymes forms of LDH and CK. What is their clinical significance?	112	69, 79	D11
22. What are isoenzymes? Explain the enzyme profile in myocardial infarction.	112, 115	69, 79	D13(RS3)
23. Clinical importance of enzymes in assessment of cardiac disease and liver function.	115	79, 81	D14(RS3)
24. Name three enzymes commonly estimated in myocardial infarction. Give its importance and limitations.	115	79	D15(RS3)
25. Diagnostic enzymes used in the assessment of different liver functions.	115	81	D16(RS3)

Short Answers

1. Classify enzymes with suitable examples. 88 53 J01, D04, J06
2. Lyases. 89 54 J98
3. K_m value of enzymes and its significance. 90 61 D05(RS2), J01, D04, D08, J11, J13
4. Explain the relationship between K_m and affinity. 91 61 D16(RS3)
5. Explain how change in temp alters the enzyme activity. 91 62 J00
6. Explain how change in pH alters the enzyme activity. 92 62 D00
7. Competitive inhibition of enzyme activity (give two examples). 94 63 J16(RS3), D05
8. Methanol poisoning can be alleviated by ethanol, justify. 94 — J06(RS2)

Contd...—

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	STNRN	VSDN	
9. Mention the actions and uses of two competitive enzyme inhibitors.	95	64	J03, D03
10. Define absolute specificity of enzyme. Give two examples.	98	68	D02
11. Coenzymes.	99	54	D13(RS3)
12. What is meant by lock and key mechanism of enzymes?	101	58	D09
13. Define allosteric enzyme with an example and name modulators for the enzyme.	103	66	D06, D12
14. Define zymogens (proenzymes). Give two examples.	105	63	D09(RS2), J00, D02, J03, J04, D08, D10
15. What are ribozymes? Mention one use of ribozymes.	108	573	D09
16. Give three/two examples of enzymes having therapeutic use and indicate their specific applications.	108	84	D12(RS3), D02
17. Enzymes of diagnostic importance.	110	84	J13(RS3), J09, D14
18. Serum amylase and its diagnostic significance.	111	83	J10(RS2), J99
19. Mention the significance of serum amylase and alkaline phosphatase estimation.	111	83, 81	J05
20. Diagnostic significance of serum alkaline phosphatase.	111	81	D15
21. Define isoenzymes. Give one example.	112	69	D05, J06, J08
22. Name the isoenzymes of LDH. Mention their significance.	112	80	D03
23. CPK isoenzymes and its clinical significance.	114	79	J99, J07, J15
24. Explain troponin as a marker for myocardial infarction.	115	79	D05(RS2)
25. Explain enzyme profile in myocardial infarction.	115	79	J07(RS2)

CHAPTER 7: VITAMINS

Long Essays

1. Give an account on chemistry, sources, absorption, daily requirement, biochemical functions, manifestations of deficiency and toxic effects of vitamin A. 122 454 D09(RS2), D98, D03, J06

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	STNRN	VSDN	
2. How provitamin D is converted to its active form? Give an account of chemistry, sources, daily requirement, biochemical functions and deficiency manifestations of vitamin D.	127	458	J03
3. Discuss the chemistry, source, requirement, metabolic functions and deficiency manifestations of vitamin C (ascorbic acid) in the human body.	135	481	D05(RS2), D99
4. What are the sources, functions, deficiency manifestations and daily recommended allowance of thiamine?	138	466	D17(RS3), D09
5. Name the coenzyme forms of vitamin involved in amino acid metabolism. Discuss the biochemical functions and deficiency manifestations of this vitamin.	146	471	J06(RS2)
6. Discuss RDA, Functions and deficiency manifestations of folic acid. How is it interlinked to vitamin B ₁₂ ?	154, 160	474	D16(RS3)
Short Essays			
1. Name a provitamin form of vitamin A. Add a note on sources, functions, daily requirement, causes and features of deficiency of vitamin A.	122	454	J09(RS2), J10(RS2), D11(RS3), J12(RS3), J18(RS3), D02, J05, J09
2. Wald's visual cycle.	124	454	J08
3. Active form of vitamin D and its biochemical role.	127	458	D08
4. Vitamin D metabolism. Add a brief note on hepatic osteodystrophy.	127	458	D05
5. Synthesis of calcitriol in the body and its uses.	127	458	J00
6. Biochemical functions and causes and features of deficiency of vitamin D.	128	459	J07(RS2), J11(RS2), J04
7. Vitamin E.	131	460	J99, D04
8. Sources, daily requirements, functions and deficiency manifestation of vitamin C.	135	481	D07(RS2), J08(RS2), D18(RS3), D07, D11
9. Explain the following aspects of thiamine: (a) Coenzyme form, (b) Biochemical function and (c) Deficiency.	138	467	J05(RS2), D01, D14

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Contd...

	STNRN	VSDN	
10. Mention the functions of thiamine pyrophosphate (TPP) citing the reactions in which it is involved.	138	467	J14
11. Explain the following aspects of riboflavin: (a) Coenzyme forms, (b) Biochemical functions.	140	467	D02
12. Give the biochemical functions of niacin with examples and manifestation of its deficiency.	143	469	J13(RS3)
13. Name the coenzyme form of vitamin B ₆ (pyridoxine). Describe the biochemical reactions involving it/biochemical functions of pyridoxine (pyridoxal phosphate co-decarboxylase).	146	471	D10(RS2), D98, J02, D14
14. Give the coenzyme role of pantothenic acid and its importance.	152	472	J15(RS3)
15. Chemistry, sources, daily requirement, coenzyme forms and functions of folic acid.	153	474	D06(RS2), J04
16. Hyperhomocysteinemia.	156	476	J07
Coenzyme form of vitamin B ₁₂ and its biochemical functions.	157	478	D15(RS3)
Short Answers			
1. Hypervitaminosis.	—	457, 460	J09
2. FIGLU excretion test.	—	—	D08(RS2), J01, D04, D10, J11, D16
3. Provitamins.	—	454	J00
4. Vitamin A—functions (antioxidant role), RDA, deficiency manifestations.	124	454	J14
5. Visual cycle.	124	454	D00
6. Mention causes and clinical features of hypervitaminosis A.	126	457	J06(RS2), J15, D15
7. Vitamin D—biochemical functions, deficiency symptoms.	128	459	J12(RS3), D15(RS3), J02, J05, J10, J14
8. Vitamin E—functions/antioxidant role.	131	461	D10(RS2), J09, J12
9. Vitamin K—biochemical role and requirement.	133	461	J13(RS3)
Vitamin C—functions (role in iron absorption), deficiency manifestations (scurvy).	136	481	D99, D05, J06, D10, J11

Contd... —

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	STNRN	VSDN	
11. Thiamine—sources, daily requirements, role, deficiency manifestations.	138	466	J00
TPP as a coenzyme in two metabolic reaction of the body.	138	467	J12(RS3), J11(RS2), D11
13. Types and causes of beri-beri.	139	467	D06
14. What is the coenzymic form of niacin and give one reaction where it is utilized?	143	469	J00, D14, D15
15. Niacine—coenzymic forms and deficiency manifestations (pellagra).	143	469	J07(RS2)
16. Functions of pyridoxal phosphate.	146	471	J10
17. How is histamine formed? What is the role of histamine?	147	297	D00
18. Biotin.	150	473	J01, D04
19. Name the anti-egg white injury factor, its source and coenzyme function.	150	473	J05, J08
20. Describe two carboxylation reactions.	150	474	J00
21. Functions of folic acid.	154	474	D16
Explain the role of folic acid in DNA synthesis.	154	475	J14(RS3), D98, D00
23. FIGLU.	155	—	J13(RS3), D15
24. Name two folate antagonists and their therapeutic use.	156	476	D02
25. What are the coenzymic forms of cobalamin?	156	478	D11
26. Name the biochemical functions of vitamin B ₁₂ .	157	478	D05
27. What are antivitamins? Give two examples (vitamin antagonists).	162	474, 476	D01
28. Mention the functions of vitamin E and vitamin K.	132, 134	461	J03, D08
29. Cause of scurvy and beri-beri.	137, 139	482, 467	D00
30. Write coenzyme forms of niacin and riboflavin.	143, 140	469, 472	J04
31. Coenzyme form of niacin and folic acid.	143, 154	469, 474	J09(RS2)
32. Coenzymic form of vitamin B ₁₂ and folic acid.	156, 154	478, 474	D00
33. What is the daily requirement of thiamine, niacin and pyridoxine?	138, 144, 149	467, 472	D08

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	STNRN	VSDN	
10. Mention the functions of thiamine pyrophosphate (TPP) citing the reactions in which it is involved.	138	467	J14
11. Explain the following aspects of riboflavin: (a) Coenzyme forms, (b) Biochemical functions.	140	467	D02
12. Give the biochemical functions of niacin with examples and manifestation of its deficiency.	143	469	J13(RS3)
13. Name the coenzyme form of vitamin B ₆ (pyridoxine). Describe the biochemical reactions involving it/biochemical functions of pyridoxine (pyridoxal phosphate co-decarboxylase).	146	471	D10(RS2), D98, J02, D14
14. Give the coenzyme role of pantothenic acid and its importance.	152	472	J15(RS3)
15. Chemistry, sources, daily requirement, coenzyme forms and functions of folic acid.	153	474	D06(RS2), J04
16. Hyperhomocysteinemia.	156	476	J07
17. Coenzyme form of vitamin B ₁₂ and its biochemical functions.	157	478	D15(RS3)
Short Answers			
1. Hypervitaminosis.	—	457, 460	J09
2. FIGLU excretion test.	—	—	D08(RS2), J01, D04, D10, J11, D16
3. Provitamins.	—	454	J00
4. Vitamin A—functions (antioxidant role), RDA, deficiency manifestations.	124	454	J14
5. Visual cycle.	124	454	D00
6. Mention causes and clinical features of hypervitaminosis A.	126	457	J06(RS2), J15, D15
7. Vitamin D—biochemical functions, deficiency symptoms.	128	459	J12(RS3), D15(RS3), J02, J05, J10, J14
8. Vitamin E—functions/antioxidant role.	131	461	D10(RS2), J09, J12
9. Vitamin K—biochemical role and requirement.	133	461	J13(RS3)
10. Vitamin C—functions (role in iron absorption), deficiency manifestations (scurvy).	136	481	D99, D05, J06, D10, J11

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	STNRN	VSDN	
11. Thiamine—sources, daily requirements, role, deficiency manifestations.	138	466	J00
12. TPP as a coenzyme in two metabolic reactions of the body.	138	467	J12(RS3), J11(RS2)
13. Types and causes of beri-beri.	139	467	D06
14. What is the coenzymic form of niacin and give one reaction where it is utilized?	143	469	J00, D14, D15
15. Niacine—coenzymic forms and deficiency manifestations (pellagra).	143	469	J07(RS2)
16. Functions of pyridoxal phosphate.	146	471	J10
17. How is histamine formed? What is the role of histamine?	147	297	D00
18. Biotin.	150	473	J01, D04
19. Name the anti-egg white injury factor, its source and coenzyme function.	150	473	J05, J08
20. Describe two carboxylation reactions.	150	474	J00
21. Functions of folic acid.	154	474	D16
22. Explain the role of folic acid in DNA synthesis.	154	475	J14(RS3), D98, D00
23. FIGLU.	155	—	J13(RS3), D15
24. Name two folate antagonists and their therapeutic use.	156	476	D02
25. What are the coenzymic forms of cobalamin?	156	478	D11
26. Name the biochemical functions of vitamin B ₁₂ .	157	478	D05
27. What are antivitamins? Give two examples (vitamin antagonists).	162	474, 476	D01
28. Mention the functions of vitamin E and vitamin K.	132, 134	461	J03, D08
29. Cause of scurvy and beri-beri.	137, 139	482, 467	D00
30. Write coenzyme forms of niacin and riboflavin.	143, 140	469, 467	J04
31. Coenzyme form of niacin and folic acid.	143, 154	469, 474	J09(RS2)
32. Coenzymic form of vitamin B ₁₂ and folic acid.	156, 154	478, 474	D00
33. What is the daily requirement of thiamine, niacin and pyridoxine?	138, 144, 149	467, 470, 472	D08

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	STNRN	VSDN
Section 2: PHYSIOLOGICAL BIOCHEMISTRY		
CHAPTER 8: DIGESTION AND ABSORPTION		
Long Essay		
1. Write in detail about the digestion and absorption of lipids? Write about causes of fatty stools.	174	191 J98
Short Essays		
1. Give an account of digestion of carbohydrates from GIT.	168	126 D13
2. Explain the mechanism involved in the absorption of glucose. Describe the causes and features of lactose intolerance.	170	127 J99, J02, D04
3. Lactose intolerance.	171	127 D05
4. Write in brief about the digestion and absorption of proteins.	171	252 D14(RS3), J06, J13
5. Digestion and absorption of lipids.	174	191 D15(RS3), J12
6. Enzymes involved in the digestion of lipids (lipases).	174	191 D05
7. Name the different types of lipases involved in lipid metabolism. Mention their sites of action, function and activation.	174	192 J03
Short Answers		
1. Name the enzymes involved in carbohydrate digestion.	168	126 D09
2. Digestion and absorption of disaccharides.	168	126 D12(RS3)
3. Describe the absorption of glucose.	169	127 J04
4. Lactose intolerance—causes and features.	171	127 D98, D99, J04, D08, J12
5. Give an example of proteolytic enzyme and its specificity.	171	253 D06, D14
6. Name the two endopeptidases with their specifications.	171	252 J09(RS2)
7. Role of hydrochloric acid in protein digestion.	172	253 J01, D04
8. How is pepsinogen activated? What is the function of pepsin?	172	253 J10
9. Pepsinogen activation and action of trypsin.	172	253 D11
10. Describe the role of bile salts in lipid metabolism.	174	191 J13

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	STNRN	VSDN	
11. What is steatorrhea? Mention the causes.	177	194	J12(RS3), J02, J03, D16
CHAPTER 9: PLASMA PROTEINS			
Long Essay			
1. What are plasma proteins? Write a note on their separation and functions.	182	384	D08
Short Essays			
1. How plasma proteins are separated? Explain the significance of M band. What is A/G ratio? What is its clinical significance?	182	384	J04
2. What is electrophoresis? Name five plasma proteins and their functions.	182	384	D11
3. Name and explain the functions of plasma proteins with clinical significance.	183	385	D14(RS3)
4. What is normal serum protein level? Mention three important functions of albumin.	183	384	D12(RS3)
5. Enumerate the functions of albumin. Mention the causes of hypoalbuminemia and consequences of hypoalbuminemia.	183	385, 387	J11(RS2), J03
6. List conditions when albumin/globulin (A/G) ratio is altered.	183	387	D12(RS3)
7. Transport proteins of blood.	184	387	J09(RS2)
8. Acute phase proteins.	186	388	J10(RS2)
9. Immunoglobulins—enumerate, structure and functions.	187	649	J03, D12, D16
Short Answers			
1. What is the normal level of plasma proteins? Name a disease which features hypoalbuminemia.	—	384, 387	D05
2. Negative acute phase reactants.	—	389	D15
3. Describe how plasma protein are separated in the clinical laboratory.	182	384	D17(RS3)
4. What is electrophoresis? Enumerate major classes of proteins separated on electrophoresis.	182	384	J01, D04
5. Serum albumin—functions.	183	385	D06(RS2), J10
6. Normal values of serum proteins and its fractions.	184	384	J99

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	STNRN	VSDN
7. Plasma proteins—enumerate and functions of plasma proteins.	184	384 J16(RS3), J06, D10, D12
8. Hypoalbuminemia.	185	387 D17(RS3)
9. Ceruloplasmin.	186	388 J99, D00, J09, J15
10. Acute phase proteins.	186	388 D18(RS3)
11. Immunoglobulins—enumerate, structure and functions. Outline the structure of immunoglobulins.	187	649 D10(RS2), D12(RS3), J18(RS3), D07, J08, D10
12. Immunoglobulin G (IgG).	188	649 J98
13. Immunoglobulin A (IgA) and immunoglobulin M (IgM).	188	649 J11(RS2)
14. Structure of immunoglobulin M.	189	649 J14
15. Bence-Jones proteins—significance and detection.	190	378, 651 D05(RS2), J06(RS2), D11(RS3), D01, D08
16. Anticoagulants.	192	— J08(RS2)

CHAPTER 10: HEMOGLOBIN AND PORPHYRIA**Long Essays**

1. Outline heme synthesis. Write a note on its function and abnormal hemoglobin.	208	325, 344 J09
2. Describe the synthesis and breakdown of hemoglobin. Write a note on hemoglobinopathies.	208, 201, 213	325, 344 D13(RS3)
3. Hemoglobinopathies (abnormal hemoglobins).	201	344 D05(RS2)
4. Sickle cell hemoglobin.	201	345 J98
5. Discuss the manifestations, molecular basis and laboratory diagnosis of sickle cell disease. What is the biological advantage of sickle cell trait?	202	345 J01
6. Heme synthesis (regulation). <i>X</i>	208	327 J17(RS3), J18(RS3), D00, D11

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	STNRN	VSDN	
7. Porphyrias—causes and general features.	210	328	D16(RS3), D18(RS3), J13, J15(RS3), J00, J03
8. What are porphyrias? How are they classified? Name the enzymatic defect and biochemical findings in any one/four of the porphyrias.	210	328	D09(RS2), D11(RS3)
9. What is porphyria? Mention the signs and symptoms of acute intermittent porphyria.	210	328	J99, D04
10. Congenital erythropoietic porphyria.	212	329	D07(RS2), D14(RS3), D98, J00, D01, D08
11. Catabolism (degradation) of heme (hemoglobin) in the body adding a note on clinical significance.	213	330	J07(RS2), J09(RS2), J14(RS3), J16(RS3), J99, D04, J14, D14
12. Bile pigments (bilirubin)—describe the metabolism (formation, transport and detoxification). Write the normal values of serum bilirubin. Name the abnormalities associated with bilirubin metabolism.	213	330	D12
13. Jaundice.	215	333	D99
14. Hemolytic jaundice.	215	333	D08(RS2)
15. Unconjugated hyperbilirubinemia.	215	332	D09
16. Hepatocellular jaundice.	215	333	D01, D04, J02, J03

Short Answers

1. What is Dubin-Johnson disease?	—	333	J01, D04
2. What is the effect of pH and pCO_2 on the oxygen dissociation curve?	198	341	D09
3. Hemoglobin as buffering agent.	198	341	D15(RS3)
4. 2,3-bisphosphoglycerate.	199	342	J06(RS2)
5. Carboxy hemoglobin.	201	344	J08(RS2), J99
6. Methemoglobin.	201	344	J10(RS2)
7. Name the hemoglobinopathies (abnormal hemoglobins).	201	344	D07, D09
8. Sickle cell hemoglobin—biochemical defects, alteration in function.	201	345	J06, J07, D13
9. Sickle cell anemia—causes, molecular defect and consequences.	202	345	D07(RS2), J11(RS2), D08, D12, J13(RS3)
10. Biochemical defect in thalassemia.	205	348	Contd... —

		STNRN	VSDN
11. Name the levels at which heme synthesis is regulated.	210	327	D02, D07
12. What porphyrias? Name one disorder indicating the underlying cause.	210	328	J04
13. Explain any two types of porphyrias.	210	328	D10
14. Acute intermittent porphyria.	210	328	J14(RS3), J18(RS3), D99, D13
15. Name two porphyrias and the enzyme defect in them.	211	328	J08
16. Degradation of heme.	213	330	J05(RS2), D06(RS2), J04
17. How is bilirubin conjugated (made water soluble).	214	331	J06(RS2)
18. Fate of bilirubin.	215	331	D15
19. Name two causes of unconjugated hyperbilirubinemia.	215	333	J07
20. Normal level of total bilirubin in serum. What is conjugated bilirubin?	215	331	D99, D06
21. Define jaundice. Mention one cause for different types of jaundice.	215	333	D03
22. Obstructive jaundice and its diagnosis (biochemical findings).	215	333	D13(RS3), J02, D08
23. Physiological jaundice.	216	333	J11
24. Name two congenital hyperbilirubinemias and defect in each of them.	216	332	D01
25. What is Crigler-Najjar syndrome? Name the enzymatic defect.	216	332	D02, D05
26. Give enzyme defect in the following conditions.			
a. Drug-induced hemolytic anemia.	a. —	a. —	J09(RS2)
b. Crigler-Najjar syndrome.	b. 216	b. 332	J14(RS3)
27. Gilberts syndrome.	216	333	J14(RS3)

CHAPTER 11: BIOLOGICAL OXIDATION

Long Essays

1. Describe the components of electron transport chain. Write a note on uncouplers and inhibitors.
2. Discuss in detail oxidative phosphorylation and enumerate its inhibitors.

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STNRN VSDN

Short Essays

1. Write the different components of electron transport chain. Mention four inhibitors of ETC.
2. Describe the single electron carrier components of respiratory chain. Indicate the sites of ATP formation during electron transport. Name two inhibitors of electron transport.
3. What are cytochromes? Indicate their location and functions.
4. What is oxidative phosphorylation? Explain its mechanism (chemiosmotic theory). Mention inhibitors and uncouplers of oxidative phosphorylation.
5. What is P:O ratio? Which are inhibitors of electron transport chain?
6. What are uncouplers? Mention the uncouplers of oxidative phosphorylation.
7. Shuttle systems to transport extra-mitochondrial reducing equivalents.
8. Classify the enzymes of biological oxidation. Give one example for each.

Short Answers

1. Differentiate between uncoupler and — inhibitors.
2. Expand ATP. What is its free energy of hydrolysis?
3. High energy (phosphate) compounds.
4. Components of electron transport chain.
5. Diagrammatic representation of mitochondrial electron transport chain and location of ATP formation sites.
6. Cytochromes.

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		STNRN	VSDN
1. <u>Oxidative phosphorylation—mechanism</u>	226	318	D06(RS2), J08(RS2), J11(RS2), J15(RS3), D17(RS3), D18(RS3), J98, J03, J05, D12, D13, D16
(chemiosmotic theory), <u>inhibitors</u> , <u>uncouplers</u> (with two examples).			
8. P:O ratio.	227	—	J09, D09, J11
9. Name the inhibitors of cytochrome oxidase.	230	320	D06
10. <u>List the site inhibitors of electron transport chain</u>	230	319	D16(RS3)
11. Ionophores.	231	17	D12(RS3)
12. Mitochondrial shuttle systems.	232	316	J13(RS3)
3. Describe malate—aspartate shuttle.	233	316	J01, D04
What is its significance?			

Section 3: METABOLISM

■ CHAPTER 12: INTRODUCTION TO METABOLISM

None

■ CHAPTER 13: METABOLISM OF CARBOHYDRATES

Long Essays

1. Describe the reactions of glycolysis 244
indicating the enzymes. Add a note on net
yield of ATP under aerobic and anaerobic
conditions. 128 D17(RS3) *

2. Give a detailed account on glycolysis. 244, 251 128, 134 J98, J08, D12
Explain the energetics and regulation of
this pathway. What is the significance of
Rapoport-Luebering cycle? 131, D12

3. Describe the process of aerobic glycolysis. 244, 648 128,
What is substrate level phosphorylation? 313, D11
What is the effect of insulin and cortisol
on blood glucose level? 167

4. Why TCA cycle is called as common
metabolic pathway? Describe in detail
the tricarboxylic acid cycle (Kreb's citric
acid cycle), energy production and its
significance. How is it regulated? What
is its amphibolic role? Explain how
carbohydrates, lipids and amino acids
enter this cycle. 253 303 J08(RS2),
D13(RS2), J04, J10, D14

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	STNRN	VSDN
5. Describe in detail the major catabolic pathway for acetyl CoA in aerobic organisms. How does it play a pivotal role in metabolism?	303	D05
6. What is gluconeogenesis? Write in detail about gluconeogenesis in humans from its predominant precursor (conversion of lactate to glucose) and mention its significance. Write about glucose alanine cycle.	135, 138 D11(RS3), D98, D00, J03	
7. Discuss the formation of glucose from noncarbohydrate substances.	135	J15
8. Trace the pathway of gluconeogenesis starting from alanine. Mention the key enzymes and how they are regulated.	135	J09(RS2)
9. Discuss about the metabolism of glycogen.	140	J99
10. What is the biomedical importance of muscle and liver glycogen? Describe the process of glycogen synthesis with its regulation. Name two glycogen storage diseases.	140, 141 D06, J11	
11. Define glycogenesis and glycogenolysis. Write the reactions of glycogenesis and glycogenolysis in liver. How are these two pathways reciprocally regulated?	140, 143 J07(RS2)	
12. Describe the reactions of pentose phosphate pathway (hexose monophosphate shunt). Why is it called multifunctional? Mention the significance of this pathway.	144	J02, J09, D15
Short Essays		
1. What is the difference between oxidative and <u>substrate level phosphorylation</u> ? Give two examples of substrate level phosphorylation with complete reaction.	313	D10(RS2), J13(RS3), D14(RS3), D04
2. How is glycogen digested and absorbed? Describe glycogenolysis in the liver.	168, 265 126, 140 J15(RS3)	
3. Glucose transporters.	243	D06
4. Regulation of glycolysis.	249	J07
5. Discuss the <u>Embden-Mayerhof pathway</u> that occurs in RBC. Add a note on its energetics.	251	J14(RS3)
6. 2,3-biphosphoglycerate pathway in erythrocytes (Rapoport-Luebering cycle).	251 134	J10(RS) D10(RS)

		STNRN	VSDN
Contd...			
7. Fate of pyruvate.	251	135	D06
8. Pyruvate oxidation.	251	135	J99, D04
9. Pyruvate dehydrogenase complex—enzymes and co-enzymes components, mechanism of action and biomedical importance.	252	135	D07(RS2), J12
10. Citric acid (TCA) cycle—reactions, energy releasing steps, amphibolic role.	253	303	J09(RS2), D11(RS3), J12(RS3), J18(RS3), J06, J13
11. Gluconeogenesis—(key) reactions (from lactate/alanine), key enzymes, significance.	258	135	D05(RS2), J06(RS2), J13(RS3), D16(RS3), D02, D05, D08, D09, D16
12. What is fate of lactate produced in the muscle? Explain the reactions.	261	138	J01
13. Cori's cycle.	261	134	J12(RS3), J14
14. Glucose alanine cycle.	261	138	J08
15. Synthesis of glycogen (glycogenesis)—reactions and its significance.	263	141	J08(RS2), D07, J12, D13
16. Glycogenolysis—reactions, regulation.	265	140	J10(RS2), J11(RS2), J16(RS3), D18(RS3), J02, D02, J05
17. Glycogen storage disease.	269	144	D06(RS2), J17(RS3), J00, J03, J06, J14
18. Hexose monophosphate shunt—reactions (oxidative phase), significance.	269	144	D13(RS3), J17(RS3), D18(RS3), D06
19. Uronic acid pathway.	275	149	J13
20. Metabolism of galactose.	277	182	D00, D07
21. Metabolism of fructose.	278	181	J00
22. Fructose intolerance.	280	182	D98
Short Answers			
1. Explain substrate level phosphorylation with two examples.	313	D01, D02, D07, J11, J12	
2. Give the significance of <u>uronic acid</u> pathway.	149	J09(RS2)	

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	STNRN	VSDN
Contd...		
3. Aldolase B.	—	
4. What are the major differences between hexokinase and glucokinase?	245	182, D00, J05
5. Glucokinase.	245	129
6. Energetics in aerobic and anaerobic pathway of EM pathway (glucose oxidation).	248	129, D99, D99, J09
7. Regulation of glycolysis at the phosphofructokinase step.	249	132, J18(RS3)
8. Write short note on <u>Rapoport-Luebering</u> cycle.	251	134, J16(RS3), D17(RS3), D12
9. Conversion of pyruvate to acetyl CoA.	251	135, J06
10. Pyruvate dehydrogenase complex.	252	135, J14(RS3), D18(RS3)
11. Amphibolic role of citric acid cycle.	257	308, D10
12. Anaplerosis and its significance.	257	308, J00, D00, J03
13. Any three enzymes unique (key) to gluconeogenesis.	259	136, J11(RS2), J13
14. Cori's cycle.	261	134, J11
15. Describe glucose alanine cycle. Mention its significance.	261	138, J01, D01, D04
16. Glycogen storage disorders.	269	144, J13(RS3)
17. Von Gierke's disease.	269	144, D17(RS3), D99
18. Muscle phosphorylase deficiency.	271	144, D98
19. Mention significance of HMP shunt pathway.	272	147, D05(RS2), J08(RS2), J08, J12
20. Glucose-6-phosphate dehydrogenase deficiency.	275	144, D07(RS2)
21. Uridine diphosphate glucose—glucuronic acid.	276	149, J15(RS3)
22. <u>Galactosemia</u> —enzyme defect, clinical features and biochemical findings.	278	183, D16(RS3), J18(RS3), D99, D02, J05, D12, D16
23. <u>Aldolase B deficiency</u> .	280	182, J98
24. Name the enzyme defective in galactosemia and hereditary fructose intolerance.	278, 280, 183, 182	J02, D06

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STNRN VSDN

CHAPTER 14: METABOLISM OF LIPIDS

Long Essays

1. What is carnitine and its role in oxidation of fatty acids? Enumerate the steps of beta oxidation of saturated fatty acids (palmitic acid). Write a note on energetic of palmitic acid. Explain the regulation of acetyl CoA in our body. 288 194 D08(RS2), J15(RS3), J01, D02, D04, J05, J06, D07, D10, D13, J15

2. Describe the formation (ketogenesis), utilization (ketolysis) and clinical significance of ketone bodies (ketosis). 295 205 J11(RS2), J18(RS3), J11

3. What is ketosis? What are the causes? 295 What are ketone bodies? Enumerate the steps of formation and utilization of ketone bodies? 206, 205 J00

4. Name the ketone bodies. Give two 295 conditions characterized by excessive production of ketone bodies. Explain the metabolic derangements and consequences of ketosis. 205, 206 J05(RS2)

5. Describe in detail the de novo synthesis 298 of fatty acids. Add a note on short- and long-term mechanisms that regulate lipogenesis. 198 J07

6. Give an account of cholesterol bio- 311 synthesis with its regulation. Add a note on atherosclerosis. 215, 228 J16(RS3)

7. What are lipoproteins? How are they 319 classified? How are chylomicrons metabolized? 217 D09

8. Classify plasma lipoproteins, explain their 319 composition, transport and functions. 218 J13(RS3)

Short Essays

1. List various types of fatty acid oxidation. 288 Write about activation of fatty acids for oxidation.

2. Describe the beta oxidation of fatty acids. 288 Add a note on energetics of palmitic acid oxidation. 194 D05(RS2), D14(RS3), D16(RS3), D05, J09

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STNRN VSDN

3. Explain how odd chain fatty acids are 293 oxidized. 197 J14

4. Metabolic activity and abnormality in 293 peroxisomes. 205 D05

5. Ketone bodies—enumerate, formation 295 (ketogenesis), utilization (ketolysis), clinical significance (ketosis). 205 J06(RS2), D09(RS2), D00, D06, J09, D12, D14

6. Ketosis. 296 206 J08

7. Outline the de novo synthesis of fatty 298 acid. What are the advantages of having 198 D13(RS3) a multifunctional enzyme complex?

8. Fatty acid synthase complex. 299 199 J11(RS2), D06, J09, D16

9. Mention the defect and clinical features 310 of four lipid storage disorder. 247 D17(RS3)

10. Name the ring structure present in 39, 313, 214 cholesterol. Write the key regulatory step 315 in the synthesis of cholesterol. Name four compounds derived from cholesterol. 311 215 D11(RS3), J18 (RS3)

11. Outline the steps for synthesis of 311 cholesterol. Discuss the rate limiting step and regulation of synthesis of cholesterol. 215 D13

12. How is HMG CoA formed? What is its 311 importance? 215 D13

13. Catabolic products of cholesterol. 315 Describe the biomedical importance of three derivatives of cholesterol. 217 J09(RS2), D10(RS2), J98, J03

14. How are bile acid synthesized? Mention 315 two functions of bile acids. 223 J15(RS3), D10

15. Lipoproteins—enumerate, composition 319 and functions. 217 J05(RS2), J14(RS3), J02, D02, D03, J06, J10

16. Chylomicrons (metabolism). 319 219 J10(RS2)

17. Give an account of metabolism of LDL. 321 220 D13

18. Fatty liver (causes) and lipotrophic 324 factors. 204 D06(RS2), J07(RS2), D08(RS2), D14(RS3), D07, D08, J13, D15

Short Answers

1. Enumerate the consequences of obesity. —

518 J11

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	STNRN	VSDN
2. What is the significance of brown adipose tissue?	203	J04
3. What is carnitine? Mention its biochemical role of carnitine in β -oxidation (carnitine cycle).	194	J08(RS2), J02, J12, J13; D13, D14
4. Energetics in the oxidation of one molecule of palmitic acid to carbon dioxide and water.	196	J18(RS3)
5. Methyl malonyl aciduria.	293	198 D98
6. Give enzyme defect in the methyl malonyl aciduria and homocystinuria.	293, 364	198, 276 D16
7. Mention how propionyl CoA is formed during fatty acid oxidation.	293	197 J00
8. Refsum's disease.	294	198 J08(RS2)
9. Ketone bodies.	295	205 D08
10. Name the ketone bodies. Mention two causes of ketosis.	295	205 D02, J03, J04
11. Ketosis.	296	206 J17(RS3)
12. Niemann-Pick disease.	309	246 J10(RS2)
13. Name two lipid storage disorders and indicate the corresponding enzyme defect.	310	247 D07
14. Name four substances synthesized from cholesterol.	315	217 D06
15. Name bile acids. How are they formed?	315	223 J10
16. Bile salts—enumerate, functions (role in digestion).	315	224 J99, J05, D08, D09, D11, J12
17. Reverse cholesterol transport.	316	222 J15(RS3), D05
18. What is normal serum level of cholesterol? Name its four biological functions.	316	223 J07(RS2)
19. What is the normal level of serum cholesterol? Name one bile acid formed from cholesterol.	316	223 J07
20. Plasma lipoproteins—enumerate, functions.	319	218 J17(RS3), D98, J08, D12
21. HDL cholesterol.	319	222 D99, J12
22. What are functions of apolipoproteins?	319	218 J09(RS2)
23. Name the cholesterol rich lipoproteins.	320	219 D06
24. Justify the role of HDL as scavenger of cholesterol.	322	222 D00

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	STNRN	VSDN
25. Fatty liver—causes.	324	204 J00, D03, J06, J12, J14
26. Lipotropic factors.	326	205 J98, J13, D14 D03
27. Mention two inborn errors of lipid metabolism and indicate the enzyme defect.	306, 309	246 J03
28. Name the biochemical defect in:	306, 309	246 J03
a. Niemann-Pick disease.		
b. Gauchers's disease.		
CHAPTER 15: METABOLISM OF AMINO ACIDS		
Long Essays		
1. Describe how ammonia is formed (sources of ammonia) in the body? Add a note on its transportation. Describe how ammonia is detoxified in the body and name two inborn errors associated with this process..	256, 257, 260	D18(RS3), D01, D05, D06, J12, D16
2. Describe in detail the steps of urea cycle. How is it linked to TCA cycle? What is the reference range for serum urea? Write the causes of uremia.	258, 261	D11(RS3)
3. Describe the urea cycle. What is the normal blood urea level? Name two conditions in which blood urea level increases.	258, 261	D02
4. Describe the metabolism, metabolic defects and special products formed from glycine giving their biomedical importance. Why is glycine nutritionally nonessential?	267	D05(RS2), J02, J04, D07
5. How is creatinine synthesized? Discuss about creatinine clearance and its clinical significance.	268	J99
6. What are biologically important compounds derived from tyrosine? Describe the metabolism of phenylalanine and tyrosine. Outline the synthesis of different products obtained from phenylalanine. Discuss the inborn errors associated with metabolism (tyrosinemia).	289	D10(RS2), J12(RS3), J17(RS3), D99, J01, D04, J07, J08, J10

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	STNRN	VSDN	
7. Name the sulfur-containing amino acids. 360	272	D05, D12	
Describe in detail the metabolism of essential sulfur-containing amino acid and add a note on the special products synthesized from it. Add a note on inborn errors associated with its pathway.			
Short Essays			
1. What are nitrogen producing substances in the body? Explain how they are excreted from the body.	—	D17(RS3)	
2. What are transamination reactions? 333 Giving two examples discuss the importance of these reactions.	256	J13(RS3), D16(RS3), J06, J11, D15	
3. Describe transamination. Mention the clinical significance of serum transaminases.	256	J05	
4. Name the coenzyme forms of vitamin B ₆ . 333 Write the mechanism of transamination.	256	J01	
5. How ammonia is detoxified in the body? 337	258	J06(RS2), J09	
6. Urea cycle (urea formation in liver)— 338 steps, regulations, disorders.	258	D06(RS2), J07(RS2), D00, D03, D10, D12, D14	
7. How is urea synthesized in the body? Give the reactions. What is the significance of urea cycle?	258	D13(RS3)	
8. Disorders associated with urea cycle 341	260	D15	
9. How is glycine synthesized in the body? 343 Name the products synthesized from glycine (biomedical importance/metabolic role/fate of glycine).	267	D06(RS2); D17(RS3), J98, D09, D15	
10. Compounds synthesized from glycine and enumerate the steps of synthesis of creatine.	268	J12	
11. Pathway for synthesis of creatine, 345 phosphocreatine and creatinine. Clinical significance of creatinine kinase.	268	J18(RS3)	

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	STNRN	VSDN	
12. How creatine phosphate is synthesized? Mention the significance of estimation of urinary creatinine.	345	268	D01
13. How is creatine synthesized? Add a note on creatinine clearance test with respect to its reference range and significance.	345	268	D11
14. Biochemical importance of phenylalanine.	346		
15. Is tyrosine an essential amino acid? 346 Justify. Write the reactions of three important biological products formed from tyrosine.	346	289	J15
		288	D12(RS3)
16. List the important products formed from tyrosine and write the metabolic pathways leading to the formation of any two of them.	349	289	D07(RS2)
17. Name and explain the steps of formation of three important compounds formed from tyrosine.	349	289	J14
18. Mention the catecholamines. How are they formed?	349	290	D16(RS3), D03
19. Outline the synthesis of epinephrine and give its functions.	349	290	J15(RS3)
20. What is phenylketonuria (PKU)? What are the alternate metabolic pathways for the accumulated phenylalanine? How is it diagnosed biochemically?	352	292	D09(RS2), D10
21. Discuss phenylketonuria under (i) enzyme defect, (ii) Manifestation, (iii) Diagnostic test.	352	292	D15(RS3)
22. Describe tryptophan metabolism.	355	294	J16(RS3)
23. Serotonin	357	295	J08(RS2), D98, D99
24. Describe the fate and functions of methionine.	361	272	D13(RS3)
25. Explain how S-adenosyl methionine is formed. Give examples of five transmethylation reactions.	361	272	J15
26. S-adenosyl methionine—formation, functions.	361	272	D00, D09
27. Metabolic functions of methionine.	361	272	D05, D13
28. Transmethylation reactions with examples.	362	273	J09(RS2), J10(RS2), J12(RS3), J12

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	STNRN	VSDN
29. Describe the conversion of methionine to cysteine. Add a note on homocystinuria.	362	272 J15(RS3)
30. Metabolic functions of cysteine.	363	273 J05(RS2)
31. Disorders of sulfur-containing amino acids.	363	275 D08(RS2)
32. Cystinuria and homocystinurias.	363	275 J11
33. Describe one carbon metabolism. What is its significance?	365	262 D15(RS3), D07
34. Maple syrup urine disease.	367	282 J09(RS2)
35. Write about aminoaciduria.	376	298 J07
36. Name the biochemical defect in the following disorders of amino acid metabolism.	377	292 D01
a. Phenylketonuria.	353	293
b. Alkaptonuria.	306	282
c. Maple syrup urine disease.	354	293
d. Albinism.	309	276
e. Homocystinuria.	336	293
37. Name the enzyme defective in:	340	246 D05
a. Alkaptonuria.	341	
b. Niemann-Pick disease.	341	
c. Albinism.	342	
d. Gaucher's disease.	342	
Short Answers		
1. Significance of non-protein nitrogenous substances.	373	J07(RS2)
2. Transamination reaction and clinical importance.	333	256 J09(RS2), D13(RS3)
3. Formation of ammonia and its toxicity in brain.	336	255 D09(RS2)
4. Formation of glutamine and its importance.	337	278 D12
5. Carbamoyl phosphate synthetase deficiency.	342	260 J98
6. What is the normal level of non-protein nitrogen (NPN) substances in the blood?	342	373 J08
7. Biologically important compounds formed from glycine.	344	268 D18(RS3), D03, J13, D14
8. How is creatinine synthesized?	345	268 J15, D16

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	STNRN	VSDN
9. Name the amino acid used for the synthesis of creatinine.	345	268 J07
10. Biologically important compounds derived from tyrosine.	349	289 D08(RS2), J11, D11
11. Melanin synthesis.	349	289 D15
12. Phenylketonuria.	352	292 D00
13. Indicate the biochemical defect in phenylketonuria.	352	292 J14
14. Alkaptonuria.	353	293 D14(RS3), J12, D15
15. Albinism.	354	293 J13
16. Derivatives of tryptophan.	355	294 J12(RS3), D05, D16
17. Serotonin—formation, functions of serotonin.	357	295 D12(RS3), J00, D00
18. Melatonin.	359	296 D15(RS3)
19. Hartnup's disease.	360	296 J12(RS3), J17(RS3), D14
20. Name the sulfur-containing amino acids. List two disorders of their metabolism.	360	275 D02
21. S-adenosyl methionine (active methionine)—formation.	361	272 D98, D11
22. Three transmethylation reactions of S-adenosyl methionine	362	273 J18(RS3)
23. Homocysteine.	363	276 J09
24. Functions of cysteine.	363	273 D15
25. Enumerate the metabolic disorders associated with cysteine metabolism indicating the defect.	363	275 J02
26. Write the composition of:	a) 363 — b) 361 272	D13
a. 3-phosphoadenosine-5-phosphate (PAPS)		
b. S-adenosyl methionine (SAM).		
27. What is meant by inborn error of metabolism? What is homocystinuria?	364	276 D11
28. Maple syrup urine disease.	367	282 J00
29. Name the deficient enzyme in:	368	260 J13
a. Hyperargininemia	352	292
b. Phenyl ketonuria.		
30. How GABA is formed? What is its function?	371	277 J03

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	STNRN	VSDN
31. Name the amino acids which form succinyl CoA.	298	D06
32. Name two metabolic disorders of amino acids metabolism and indicate the enzyme defect.	292 293 282 293 276	D07
33. Mention the enzyme defects in phenylketonuria and homocystinuria.	292 276	J05
34. Name the enzyme defect in:	377	D14
a. Phenylketonuria	292	
b. Alkaptonuria.	282	
35. Name the biochemical defect in:	377	J03
a. Phenylketonuria	292	
b. Maple syrup urine disease.	282	
36. Polyamines.	378	281
		D15(RS3)

CHAPTER 16: INTEGRATION OF METABOLISM**Short Essay**

1. Discuss the biochemical/metabolic changes during starvation. 385 122 J14(RS3), J03, J13, D14

Short Answers

1. Sources and fate of acetyl CoA. — 303 D01, J12
2. Biochemical changes in starvation. 385 122 J16(RS3) *Ans*

CHAPTER 17: METABOLISM OF NUCLEOTIDES**Long Essays**

1. What are nucleotides? Explain the catabolism of purine nucleotides. Write briefly on the metabolic disorders associated with purine metabolism. 72, 395 542, 547, 548 J07(RS2)

2. What are sources of C and N atoms of purine? Describe the biosynthesis of purine and add a note on its regulation. 389 544 J13(RS3)

3. Enumerate the reactions of purine degradation and add a note on gout. 395 547, 548 J13

4. How is uric acid formed from purine and add a note on hyperuricemia. 395 547, 548 J18(RS3)

5. Describe the synthesis of pyrimidine and its regulation. 399 549 D12(RS3)

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Short Essays

1. What are nucleotides? What are the sources of C and N atoms of purine nucleotide? Mention the metabolic disorders associated with purine metabolism. 72, 389, 542, 399 544, 548 J14(RS3)

2. Briefly outline the steps of de novo synthesis of purine. 391 544

3. Purine salvage pathways. 393 546

4. Salvage pathway. 393, 402 546

5. Catabolism (degradation) of purines and related disorders. 395 547

6. Synthesis of uric acid. 395

7. How is uric acid formed in the body? What is gout? What is the treatment? Explain the basis for the treatment. 395 547 J98 D15(RS3)

8. Hyperuricemia—causes, features and drugs to lower plasma uric acid levels 395 548 J04, J10

9. What is gout? Give its biochemical basis, clinical manifestations and line of treatment. 395 548 D12(RS3), D16(RS3), D99, D00, D07, D11

10. Lesch-Nyhan syndrome and orotic aciduria. 397, 402 549, 551 J05(RS2), D08(RS2)

11. Degradation of pyrimidines. 402 551 J08(RS2)

Short Answers

1. Indicate sources of various (carbon and nitrogen) atoms of purine ring by a diagrammatic representation. 389 544 D09(RS2), D03, D07

2. Describe two reactions of salvage pathway of purine nucleotide synthesis. 393 546 J05

3. What is the function of thioredoxin? 394 551 D09

4. Hypoxanthine. 395 546 D98

5. Mention any two causes of hyperuricemia. 395 548 J06

6. Gout—causes. 395 548 J05(RS2), D01

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	STNRN	VSDN	
7. What is the normal serum uric acid level? Name two pathological conditions associated with hyperuricemia.	395	548	D02
8. Allopurinol.	398	549	J98
9. Lesch-Nyhan syndrome—causes, features.	399	549	J10(RS2), D14(RS3), D03, J08, J15
10. Identify the sources of carbon and nitrogen atoms of pyrimidine ring.	400	550	D13
11. Deficiency features of orotic aciduria. Explain the biochemical basis of manifestations.	402	551	J11(RS2), J07, J10, D16
CHAPTER 18: MINERAL METABOLISM			
Long Essays			
1. Describe in detail the sources, daily requirement, absorption, distribution, functions, normal level and factors regulating blood calcium level. Discuss about any clinical condition with abnormal blood calcium level (tetany).	406	491	D06(RS2), J09(RS3), D00, D01, J12, D14
2. Explain the metabolism of iron under the following headings. (a) Absorption and transport, (b) Biochemical functions, (c) Hemosiderosis.	416	499	D13
Short Essays			
1. List any three trace elements with their biological function.	407	491	J17(RS3)
2. Calcium—sources, daily requirements, factors affecting absorption, biochemical role (functions) and deficiency signs of calcium.	406	491	J12(RS3), J98, D99, D03, J09, D11
3. Intestinal absorption of calcium.	408	492	J15
4. Calcium homeostasis (regulation of blood calcium level)—by vitamin D, PTH and calcitonin.	409	493	D09(RS2), J00, J02, D07, D13
5. Write briefly about the role of parathyroid hormone in the regulations of serum calcium level.	409	494	J06
6. Renal rickets.	411	—	J98
7. Give an account of phosphorus metabolism.	412	496	J13(RS3)

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	STNRN	VSDN	
8. What are the major biochemical functions of sodium and potassium? Mention their normal serum levels.	413, 414	414, 415	D12(RS3), D03
9. What is the normal range of serum potassium and write about hypokalemia.	414	415	D10(RS2)
10. Iron—source, daily requirement, absorption, factors affecting iron absorption, transports, storage and physiological role of iron.	416	499	J07(RS2), D12(RS3), D16(RS3), D98, D99, D02, J04, J07, J10, J13, D15
11. What are the causes and consequences of iron toxicity?	419	502	D16
12. What is Wilson's disease? State the cause and treatment policy.	420	503	D17(RS3)
13. Functions of iodine.	420	504	J11(RS2)
14. Functions of selenium.	423	504	J10(RS2)
Short Answers			
1. What is renal tubular acidosis? Mention two biochemical findings in this condition.	—	—	J02
2. Trace elements.	405	491	D06(RS2), D08(RS2)
3. Functions of calcium.	406	492	J11, D16
4. What is the normal serum calcium level? Explain its regulation.	409	493	D05(RS2), J05
5. List the hormones in plasma calcium regulation.	409	493	D06
6. Calcitriol.	409	493	J98
7. Write short note on rickets.	411	—	J13
8. Functions of magnesium.	412	498	J09
9. Hyponatremia (causes).	414	414	J98
10. Describe the functions of potassium.	414	415	J05
11. Iron—absorption, transport and storage.	417	499	D10(RS2), D00, D10
12. Ferritin.	418	500	D08
13. What is hemosiderosis? How it is caused?	419	502	—
14. Causes of hemochromatosis.	419	503	J01, D04
15. Functions of copper.	419	503	J12(RS3), D09
16. Copper-containing protein and its clinical significance.	419	503	J98

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	STNRN	VSDN
17. Four enzymes with copper as integral component.	419	503 D12(RS3), J02, D08
18. Menke's disease.	420	503 J12(RS3)
19. Wilson's disease.	420	503 J00
20. Importance of iodine.	420	634 J14(RS3) <i>✓</i>
21. Iodine metabolism.	421	634 D07(RS2) <i>✓</i>
22. Biological role of zinc in the body.	421	504 J06(RS2), D98, J99, J08, J10, J12, J14
23. Name a zinc-containing enzyme and its catalytic role.	421	504 D05
24. Fluorosis.	423	504 J08(RS2) <i>✓</i>
25. Functions of fluoride in dental health.	423	504 J07
26. Metabolic role of selenium.	423	504 J18(RS2), D99, D08, J15
27. Mention the functions of (a) Iodine, (b) Zinc.	420, 421	634, 504 D01
28. Describe the functions of iodine and fluorine.	420, 423	634, 504 J05
29. Functions (metabolic roles) of zinc and selenium.	421, 423	504 J05(RS2), J01, D04

Section 4: CLINICAL BIOCHEMISTRY AND NUTRITION

CHAPTER 19: HORMONES

Short Essays

1. General mechanism of action of steroid hormones.	430	632 J08(RS2)
2. Give a diagrammatic representation of mechanism of steroid hormone action.	432	625 D12(RS3)
3. Significance of aldosterone.	444	632 J99, D04
Short Answers		
1. Thyroid function tests—routine and anti-thyroid peroxidase antibody (TPO).	430	637 D11(RS3)
2. What is second messenger? Give an example.	430	622 D11
3. Mechanism of action of steroid hormones.	430	632 D14(RS3)
4. Give a diagrammatic representation of action of a steroid hormone.	432	625 J05
5. Cyclic AMP—functions.	432	623 D03
6. Reference range of TSH and its significance.	442	637 D11

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	STNRN	VSDN
7. Clinical interpretation of estimation of thyroid stimulating hormone (TSH) in blood.	442	637 D09(RS2)
8. Laboratory diagnosis for hypothyroidism.	443	638 J16(RS3)

CHAPTER 20: ORGAN FUNCTION TEST

Short Essays

✓ Liver function tests (based on secretory/ metabolic and excretory functions).	454	357 D08(RS2), J14(RS3), J98, J01, D03, J06, J10, D10, J11 D00, J13, J15
✓ Vander Bergh's reaction (principle) and its clinical significance.	456	359
3. Serum enzymes estimated to assess the liver function.	456	362 D98
4. Hippuric acid test.	460	— D15
5. Describe renal function tests.	460	370 J02, J05
✓ Clearance tests.	462	373 J06(RS2), J15 D05(RS2)
✓ Define renal clearance. Name clearance tests used to assess kidney function. Explain any one of the clearance tests and mention its significance.	462	373
8. Creatinine clearance test.	462	374 D08
✓ 9. Standard urea clearance test.	463	376 J12(RS3) <i>✓</i>
10. Concentration dilution test.	463	379 D15

Short Answers

1. Test for urobilinogen.	—	360 J99
✓ 2. Enumerate three/four functions of the liver and tests with reference ranges to assess them.	455	358 D11(RS3), D07
3. Describe Vander Bergh's reaction. Mention its significance.	456	359 J18(RS3), D18(RS3), J99, J04, D14
✓ 4. Write short note on enzyme assays for liver function/Marker enzymes of liver function test.	456	362 D16(RS3), D13
5. Enumerate renal function tests.	460	370 J11(RS2), D03
✓ 6. Tests to assess renal tubular function.	461	378 J17(RS3)
7. Tests of renal distal tubular function.	—	378 J16(RS3)
8. What is meant by renal clearance? How is creatinine clearance calculated?	462	374 D14(RS3)
9. Clearance tests.	462	374 D06(RS2)

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	STNRN	VSDN
10. Creatinine clearance test.	462	374
		J09(RS2), J13(RS3), D14
CHAPTER 21: WATER, ELECTROLYTE AND ACID-BASE BALANCE		
11. Alkaline tide.	465	364
		D98
Long Essays		
1. What is the normal pH of blood? Explain the mechanism of how it is regulated.	475	397
2. What is the importance of maintaining acid-base balance in the body? Write in detail how kidney helps in maintaining acid-base balance.	475	397
		D07(RS2)
Short Essays		
1. Discuss the regulation of water by rennin-angiotensin system.	—	412
2. Define pH and buffer. Mention the buffer systems present in plasma, erythrocytes and urine.	476	396, 398
3. What are buffers? Name the buffer system of body fluids. Discuss any one/two buffer system of the body.	476	396
4. What are buffers? Explain the plasma buffers in maintaining acid-base balance.	476	396
5. Blood buffers and their role in acid-base balance.	476	398
6. Extracellular buffers.	476	398
7. Bicarbonate buffer system of blood.	476	398
8. What is Henderson-Hasselbach equation? Describe the buffer systems in blood and urine.	477	396
9. Write the Henderson-Hasselbach equation and its significance in bicarbonate buffer system.	477	396
10. Use of phosphate buffer in maintaining acid-base balance.	477	398
11. Renal regulation and respiratory regulation of body pH.	477	399
12. Role of lungs in pH maintenance (respiratory regulation of pH).	477	399
13. Erythrocytes in acid-base balance.	478	399
14. Chloride shift.	478	—
		J18(RS3)
		J08(RS2)

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	STNRN	VSDN
15. Renal regulation of acid-base balance (give the key reactions of renal mechanism in acid-base balance).	478	399
		D06(RS2), D09(RS2), D11(RS3), D12(RS3), J15(RS3), J09, J12, J14, D14
16. What is anion gap? Explain normal anion gap acidosis and high anion gap acidosis with examples.	482	403
		J05(RS2), D10(RS2), D09
17. How does metabolic alkalosis differ from respiratory alkalosis. Explain the cause and compensatory mechanism involved?	483	404, 405
		J00
18. Metabolic acidosis—causes, biochemical findings.	483	403
		J08(RS2), J98, J11
19. Explain metabolic and respiratory acidosis.	483	403, 405
20. What are the causes of respiratory acidosis? List the primary abnormalities of respiratory acidosis.	483	405
		D14(RS3), J01
21. Respiratory alkalosis.	484	405
22. Hormonal regulation of fluid and electrolyte.	470, 473	411
		D15(RS3) D11(RS3), D16
23. What are buffers? Explain the role of the kidneys in homeostasis of pH of blood.	476, 478	396, 399
		D11
Short Answers		
1. Hormones that regulate water balance.	470	411
2. Name the serum electrolytes and give their normal values.	472	411
3. Define buffers. Name the blood buffer system.	476	396
4. What are buffers? Write the importance of bicarbonate buffer system?	476	396
5. List the major kidney mechanism for regulation of pH of extracellular fluid.	478	399
6. Carbonic anhydrase.	478	399
7. Discuss the role of carbonic anhydrase in the acid-base regulation.	478	400
8. Chloride bicarbonate shift.	478	—
9. Reclamation of bicarbonate by kidneys.	479	400
10. Titratable acidity.	479	401
11. Give an account of anion gap.	482	403
		J14

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	STNRN	VSDN
12. What is anion gap? Mention two causes for increased anion gap?	482	J03
13. Define anion gap. What happens to anion gap in acidosis resulting from renal failure?	482	J07
14. Metabolic acidosis—causes and features	483	J04
15. Respiratory acidosis—define, causes, compensation.	483	J05, D13
16. Alkalosis.	483	404
17. Explain why acidosis causes hyperkalemia? How it is corrected?	484	J03

CHAPTER 22: TISSUE PROTEINS AND BODY FLUIDS**Short Answers**

1. Amino acids in collagen.	488	672	D99
2. Discuss the nutritional role of milk and dairy products.	495	421	D17(RS3)

CHAPTER 23: NUTRITION**Short Essays**

1. Basal metabolic rate (BMR)—definition, determination, normal value, factors affecting.	512	J06(RS2), D07(RS2), J09(RS2), D13(RS3), J18(RS3), D18(RS3), J08, J09, J12
2. What is meant by dietary fiber? What are the sources of dietary fibers? Discuss the importance of it in nutrition. Outline the functions of proteins.	514	D14(RS3), J15(RS3)
3. Nitrogen balance—factors affecting.	509	J05(RS2), J11(RS2)
4. Define biological value of protein. What do you mean by complementary proteins? Give examples. What is the requirement of protein in diet?	511	J17(RS3), J14
5. What is a balanced diet? Discuss the components of a balanced diet.	513	—
6. Protein-energy malnutrition.	514	516
7. Describe the causes and features of kwashiorkor and marasmus.	515	J15(RS3), D13
	516	J10(RS2), D11(RS3), D08
	517	J05

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Short Answers

	STNRN	VSDN
1. Calorific value—definition, calorific value of protein and fat.	511	D02
2. Respiratory quotient (RQ)—definition, RQ values of carbohydrate, lipids and proteins, factor affecting, conditions associated with lowering RQ.	511	J10(RS2), D01, J04, J05, D05, D10, D14, D15
3. Basal metabolic rate (BMR)—definition, factors affecting, causes of increased BMR.	512	J02, J04, D09, J10
4. Specific dynamic action (SDA) and basal metabolic rate (BMR).	512	D12(RS3)
5. Specific dynamic action of food stuff.	503	512
6. Calculate energy requirement per day of a student of 20 years.	513	J12(RS3), J15(RS3), J16(RS3), D07, D12, J15
7. Dietary fiber—sources, examples, beneficial effects (role in health and disease).	514	D07(RS2), D08(RS2), J10(RS2), D10(RS2), D18(RS3), J00, J01, J02, D04, D10, J13
8. Nitrogen balance.	509	515 D11
9. Positive nitrogen balance.	510	515 D10
10. Biological value of protein.	511	516 J15
11. Limiting amino acid.	512	516 J08(RS2)
12. Balanced diet.	513	— J16(RS3), J98, D99, D13
13. Nutritional deficiency disorders in India.	514	516 D07
14. Protein-energy malnutrition (biochemical changes).	514	516 J07(RS2), D10(RS2), D16(RS3), J13
15. Kwashiorkor—biochemical findings.	515	517 D02, D15
16. Marasmus.	515	517 D98, J06
17. Nutritional deficiency anemias.	515	501 D05(RS2)
18. List two differences between marasmus and kwashiorkor.	516	517 D01

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Section 5: MOLECULAR BIOLOGY AND BIOTECHNOLOGY**CHAPTER 24: DNA—REPLICATION, RECOMBINATION AND REPAIR****Long Essays**

1. Discuss the structure and replication of DNA. 76, 524 556, 559 J10(RS2)
2. Describe the synthesis of DNA. Write a note on replication of DNA. 524 559 D15(RS3)
3. Define replication. Describe in detail the process of replication in eukaryotes. Mention its inhibitors. 527 559 D14(RS3), J16(RS3)*
4. Write about DNA replication and repair. 524, 535 559, 562 J13

Short Essays

1. What is meant by exonucleases and endonucleases? Write the importance of each. 527 563 J01
2. What is replication? Describe the steps of replication. 524 559 D00, D02, D07
3. Describe the replication of DNA. 527 559 J05
4. Replication of lagging strand. 528 561 D07(RS2)
5. Mutations (point mutation). 534 591 J05(RS2)
6. Point mutation—define and effects. 534 591 D17(RS3)
7. Base excision DNA repair mechanism. 536 564 J10

Short Answers

1. Name bacterial DNA polymerases. — Mention its significance.
2. Replication of DNA. 524 559 D98, J09
3. What is meant by semiconservative mechanism of replication? 524 559 J10
4. Okazaki fragments. 525 562 J17(RS3), D18(RS3), J15, D16
5. Cell cycle. 530 594 J17(RS3)
6. What is mutation? List two examples. 534 591 J02, D14
7. Mutagens. 534 593 J17(RS3)
8. Point mutation with two examples. 534 591 J15(RS3), D15(RS3), J12
9. Silent mutation. 534 592 J15
10. Missense mutation—list the effects. 535 592 J10, D15
11. What is nucleotide excision repair? 536 563 J07
12. Causes for xeroderma pigmentosa. 536 564 D12(RS3)

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CHAPTER 25: TRANSCRIPTION AND TRANSLATION**Long Essays**

1. Give a detailed account of the eukaryotic transcription process. How is it regulated? Name the inhibitors of transcription. 543, 545 570, 574 J14
2. Define translation (protein biosynthesis). 546, 581, 584 J14(RS3), four inhibitors and their action. 549, 555 J17(RS3)*
3. Explain the process of translation. Add a note on post-translational modifications. 549, 557 581, 584 D18(RS3)
4. What is genetic code? Describe the process of eukaryotic translation. 546 580, 581 J11(RS2)
5. What is lac-operon? Explain the steps of activation, initiation, elongation and termination of protein biosynthesis and its regulation. 562, 550 595, 581 J05(RS2), D08(RS2), D10(RS2), D11

Short Essays

1. Transcription (factors required). 540 570 D06(RS2), D01, J06
2. Post-transcriptional modifications of mRNA. 544 572 D09(RS2), D16(RS3), J10, D12
3. Genetic code—definition (Codon), salient features, initiating and terminating codon. 546 580 D06(RS2), J08(RS2), J17(RS3), D17(RS3), D03, J15
4. Write part played by ribosomes in protein biosynthesis. 549 579 J00
5. Post-translational modification. 557 584 D15

Short Answers

1. RNA polymerase. 543 570 D16(RS3), D15
2. Name the post-transcriptional modifications of mRNA. 544 572 D06
3. Name two inhibitors of RNA synthesis. 545 574 D05
4. Reverse transcriptase and its significance. 546 573 J01, J03, D04, J06
5. Codon and its characteristics. Name the chain initiating codon and chain terminating codons. 546 580 J99, D99, J05, D07

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Companion for 1st MBBS

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	STNRN	VSDN	
6. Genetic code—characteristic features.	546	580	D09(RS2), D10(RS2) *
7. Write short note on codon and 'Wobble hypothesis'.	546, 548	580	D13
8. Degeneracy of codon.	547	580	J01, D04, D09
9. Wobble phenomenon.	548	580	J15
10. Which are inhibitors of protein biosynthesis?	555	584	J07(RS2)
11. Post-translational modifications with examples.	557	584	J13(RS3), D07
CHAPTER 26: REGULATION OF GENE EXPRESSION			
Short Essays			
1. Describe with an example regulation of gene expression.	561	595	D13(RS3)
2. <u>Lac-operon</u> concept of gene regulation.	562	595	D17(RS3), J11
Short Answer			
1. <u>Operon</u> concept.	562	595	D11(RS3)
CHAPTER 27: RECOMBINANT DNA TECHNOLOGY			
Long Essay			
1. Discuss in detail recombinant DNA technology and its clinical application.	571	600	J08(RS2)
Short Essays			
1. Recombinant DNA technology and its applications.	571	600	D08(RS2), J16(RS3), D16(RS3), J17(RS3), J03, J04, D08, D10, D15
2. What is the difference between endonuclease and restriction endonuclease? Give two examples for endonuclease.	571	601	D15(RS3)
3. What is a restriction endonuclease? Give any two examples with their biomedical importance. Explain their role in recombinant DNA technology.	572	601	J13(RS3), J16(RS3) *
4. What is plasmid? What is its application in recombinant DNA technology?	572	600	J07(RS2), J10
5. Explain the principle, requirements, steps of polymerase chain reaction and its application.	579	612	D14(RS3), D18(RS3), J15, D16

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Biochemistry

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1. What is the difference between endonuclease and restriction endonuclease? Give two examples of restriction endonuclease.	601	D08(RS2)	
2. What are restriction enzymes? List three features of restriction enzymes.	601	D14(RS3)	
3. What are DNA probes? Mention the types of DNA probes.	608	D17(RS3)	
4. What is a chimeric (recombinant) DNA molecule? Give the applications of recombinant technology.	602	D09(RS2), D11(RS3), D05, D11, D12	
5. What are restriction endonucleases? Give two examples.	601	D03	
6. What is a vector? What are the commonly used vectors in recombinant DNA technology?	601	J18(RS3), J07	
7. Southern Blot techniques.	576	608	J14(RS3)
8. What is Polymerase Chain Reaction (PCR)? Mention application of PCR.	579	612	J05(RS2), J06(RS2), J09(RS2), J14(RS3), J04
9. What is restriction fragment length polymorphism? Give one clinical application for the same.	583	611	J07

Section 6: CURRENT TOPICS

CHAPTER 28: HUMAN GENOME PROJECT

None

CHAPTER 29: GENE THERAPY**Short Essay**

1. Gene therapy—its application in medicine.

Short Answer

1. What is gene therapy? Name vectors used for gene therapy.

CHAPTER 30: BIOINFORMATICS

None

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CHAPTER 31: METABOLISM OF XENOBIOTICS (DETOXIFICATION)

Short Essays

1. What are Xenobiotics? Give an account of phase two detoxification reactions. 613 525 D18(RS3)

2. What is biotransformation? Discuss the different phases of biotransformation with an example. 613 525 J14(RS3)

3. Detoxification with examples of reactions involved. 613 525 D05(RS2), J05, J13

4. Define detoxification. Give any four reactions of phase II detoxification. 613 525 J17(RS3)

5. What is detoxification? Explain the role of oxidation and conjugation reactions in the liver for detoxification. 613 525 D11

6. Detoxification by oxidation. 614 526 J11(RS2)

7. Detoxification by conjugation with examples. 615 527 D10

Short Answers

1. How is paracetamol detoxified? — — J08

2. What are xenobiotics? What is the role of Glutathione in detoxification. 613 525 D10(RS2)

3. What is biotransformation? Give two examples. 613 525 D02

4. Detoxification. 613 525 D17(RS3), J11

5. Explain any one detoxification mechanism with an example. 614 526 D12

6. Detoxification reaction—phase I. 614 526 D14(RS3)

7. Give two examples of detoxification by oxidation and reduction. 614 526 D09(RS2) *

8. Detoxification of alcohol. 614 526 J09(RS2) *

9. Role of cytochrome P450 in detoxification reaction. 615 526 D08(RS2), D14

10. How is aspirin detoxified? 615 527 D07

11. Conjugation as detoxification mechanism with two examples. 615 527 J06(RS2), J07(RS2), D98

CHAPTER 32: PROSTAGLANDINS AND RELATED COMPOUNDS

Short Essays

1. What are eicosanoids? Mention their biomedical importance. 618 243 J02

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STNRN VSDN

2. Prostaglandins—classification and biological action. 620 243 J09(RS2), D98, J07

Short Answers

1. Eicosanoids—names/functions. 618 243 D14(RS3), J08, D16

2. What are prostaglandins? Mention their biological functions. 618 243 D06(RS2), D13(RS3), D01, D10

3. What is arachidonic acid? Mention two uses of arachidonic acid. 619 242 J10

CHAPTER 33: BIOLOGICAL MEMBRANES AND TRANSPORT

Short Essays

1. Cell membrane—fluid mosaic model. 623 13 D09(RS2), D17(RS3), J14

2. Different transport mechanisms across the cell membrane. 624 15 J18(RS3), D09, J11

3. Facilitated diffusion. 625 15 D10

4. Define active transport. Explain the different types of active transport with suitable examples. 626 17 D18(RS3), J15

5. Sodium-potassium pump. 626 17 J10

6. Classify transport mechanisms across cell membranes. Define uniport, symport and antiport. Give an example of each. 627 19 D11(RS3)

Short Answers

1. Cell membrane—functions. — 13 D07(RS2), J09

2. Describe secondary active transport. Mention one disorder of secondary active transport. — 17 J05

3. Write four structural features of cell membrane. 623 13 J13

4. Transport across cell membrane. 624 15 D15(RS3)

5. Define the term active and passive transport. 625 15 J13

6. Active transport. 626 17 J11(RS2), D06

7. What is uniport and symport transport system? Give an example. 627 19 D11

8. Endocytosis. 628 19 D08, J11

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CHAPTER 34: FREE RADICALS AND ANTIOXIDANTS

Short Essays

1. Antioxidants.	632	429	J08(RS2), J99, D04
2. Antioxidant vitamins.	632	429	D06

Short Answers

1. Free radicals—definition, generation, functions.	629	425	J05(RS2), J12(RS3), D10
2. <u>Reactive oxygen species (ROS)</u> — enumerate, formation, characteristics.	630	425	D08(RS2), D10(RS2)
3. Free radicals and disease.	631	427	J11(RS2)—
4. Free radical scavenging systems.	632	426	D18(RS3)
5. <u>Antioxidants</u> with examples.	632	429	D06(RS2), D11(RS3), D12(RS3), J15(RS3), D98, D03
6. What are antioxidants? Name chain breaking and preventive antioxidants.	632	429	J07(RS2)
7. Nonenzymatic <u>antioxidants</u> .	632	429	J16(RS3)
8. Mention the dietary antioxidants.	632	429	J14

CHAPTER 35: ENVIRONMENTAL BIOCHEMISTRY

Short Answer

1. What are the effects of lead poisoning on heme synthesis?	638	328	J14
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CHAPTER 36: INSULIN, GLUCOSEHOMEOSTASIS AND DIABETES MELLITUS

Long Essay

1. What is the normal blood glucose level? Why does it need to be regulated? Describe the regulation of blood glucose. What are the causes of hyperglycemia and hypoglycemia?	646	159	D09(RS2), D14(RS3), D03
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Short Essays

1. Regulation of blood sugar.	646	159	D12
2. Mechanisms of action of glucagon.	646	167	D07(RS2)
3. Explain the role of hypoglycemic hormones (insulin) in regulation of blood glucose.	648	166	J05(RS2)
4. Glucose tolerance test (GTT).	652	162	D02, J07, D09

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5. Diabetes mellitus (metabolic changes).

654	170	D08(RS2), D12(RS3)
Short Answers		
1. Glucose tolerance test (GTT) graph for renal glycosuria.	163	D11(RS3)
2. Name two physiological actions of insulin.	164	D05
3. Intracellular insulin receptor.	164	165
4. What are metabolic effects of glucagon?	165	J06(RS2)
5. How does insulin regulate blood glucose?	167	J04
6. Name the insulin antagonists.	167	D13
7. Glucose tolerance test.	168	D01
8. What are the features of a normal glucose tolerance curve?	169	J11
9. What is glycosuria? Mention the causes of different types of glycosuria.	169	J10
10. Renal threshold for glucose and its significance.	169	D10(RS2)
11. Renal glycosuria.	169	J10(RS2), J99, J12, J14, J15
12. What is renal glycosuria? How do you differentiate it from diabetic glycosuria?	169	J03

CHAPTER 37: CANCER

Short Essays

1. What are oncogenes? Discuss two tumor markers and their clinical application.	659, 662	664	D15(RS3)
2. Proto-oncogenes and oncogenes (mechanisms involved in activation of proto-oncogenes to oncogenes).	660	664	D10(RS2), D16
3. Tumor markers.	662	666	J07(RS2)
4. Clinical importance of alpha-fetoprotein (AFP) and prostate-specific antigen (PSA). Give their normal values.	663	667	D12(RS3)

Short Answers

1. Mechanism of carcinogenesis.	—	661	D09(RS2)
2. Plasmids and oncogenes.	—	664	D13(RS3)
3. Prostate specific antigen (PSA).	—	668	J08(RS2)
4. Chemical carcinogens.	658	662	D16

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	STNRN	VSDN
5. Oncogenes—definition, examples, role in carcinogenesis.	664	J05(RS2), D06(RS2), D11(RS3), D18(RS3), J04, J06, J09
6. Growth factors—enumerate, functions, role in carcinogenesis.	666	D05(RS2), D07(RS2)
7. Tumor markers—definition, examples, diagnostic significance.	666	D08(RS2), D14(RS3), D15(RS3), J18(RS3), D02
8. Anticancer agents.	664	668
		D13(RS3)

■ CHAPTER 38: ACQUIRED IMMUNODEFICIENCY SYNDROME

None

Section 7: BASICS TO LEARN BIOCHEMISTRY

■ CHAPTER 39: INTRODUCTION TO BIO-ORGANIC CHEMISTRY

None

■ CHAPTER 40: OVERVIEW OF BIOPHYSICAL CHEMISTRY

Short Essay

1. Radioactive isotopes of iodine and their clinical application.	685	683	D10(RS2)
1. How does a buffer maintain the pH? Give an example of blood buffer.	679	398	D06
2. Define radioactivity. Name the uses of: a. ^{131}I . b. Co-60.	685	681, 682	D01
3. Radioisotopes.	685	680	D13(RS3)
4. Mention two isotopes and mention their application in medicine.	685	682	D08(RS2), D03, J07

■ CHAPTER 41: TOOLS OF BIOCHEMISTRY

Short Essays

1. Chromatography.	687	434	J00
2. Electrophoresis.	690	432	D00

Short Answers

1. Principle of chromatography.	688	434	J15
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	STNRN	VSDN	
2. Electrophoresis—principle, normal pattern of serum proteins, diagnosis importance.	432	D15(RS3), D16(RS3), D03, J10, J12	
3. Immunoelectrophoresis.	691	433	J08(RS2)
4. Monoclonal antibodies.	696	669	J14(RS3)

■ CHAPTER 42: IMMUNOLOGY

None

■ MISCELLANEOUS

Long Essay

1. Discuss the significance of multi enzyme complexes with respect to carbohydrate and lipid metabolism.

Short Essays

1. Multienzyme complexes.
2. How would you explain osteoporosis in following conditions?

- a. Prolonged use of phenobarbitone
- b. Chronic liver or renal disease
- c. Vitamin D resistant rickets
- d. Fanconi's syndrome
- e. Vitamin D dependent rickets type II.

Short Answers

1. Indicate the biochemical defect in lactose intolerance and Gilbert's disease.
2. Name the enzyme defects in the following cases:(1) Refsum's disease, (2) Alkaptonuria.
3. GABA, PUFA and SAM and their importance.
4. Name two inborn errors of metabolism and the associated enzyme.
5. Abnormal components of urine.
6. Define proteinuria. Mention a biochemical test to detect proteinuria.
7. What are G-proteins?
8. Multienzyme complex.
9. What are cold agglutinins?

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10. What is reference range/values? How is it calculated?	—	D07(RS2), J16(RS3)
11. Achylia gastrica.	—	J98
12. Reference range of potassium and albumin in the serum.	—	D09
13. Normal values of: a. Serum creatinine (0.5–1.5 mg/dL). b. Serum amylase (80–180 somogyi units/dL).	—	D99
14. Mention the normal serum values for: a. AST (4–45 IU/L). b. ALT (3–40 IU/L). c. Urea (15–40 mg/dL). d. Creatinine (0.5–1.5 mg/dL).	—	J02
15. Normal serum levels of: a. Serum calcium (9–11 mg/dL). b. Serum phosphorus (3–4.5 mg/dL).	—	J06, D08
16. Mention the normal levels of: a. Serum protein (6–8 g/dL). b. Urea (15–40 mg/dL). c. Creatinine (0.5–1.5 mg/dL).	—	D06(RS2)
17. Give the normal blood level of the following: a. Fasting blood glucose (70–100 mg/dL). b. Total protein (6–8 g/dL). c. Urea (15–40 mg/dL). d. Bicarbonate (24–30 mEq/L). e. Sodium (135–145 mEq/L). f. Potassium (3.5–5 mEq/L).	—	J09(RS2)
18. Give the normal values of: a. Fasting blood glucose (70–100 mg/dL). b. Cholesterol (150–200 mg/dL).	—	D13
19. Name the normal Serum levels of: a. Sodium (135–145 mEq/L). b. Potassium (3.5–5 mEq/L).	—	J14
20. Give the normal values of: a. Fasting blood glucose (70–100 mg/dL). b. Blood urea (15–40 mg/dL).	—	D14